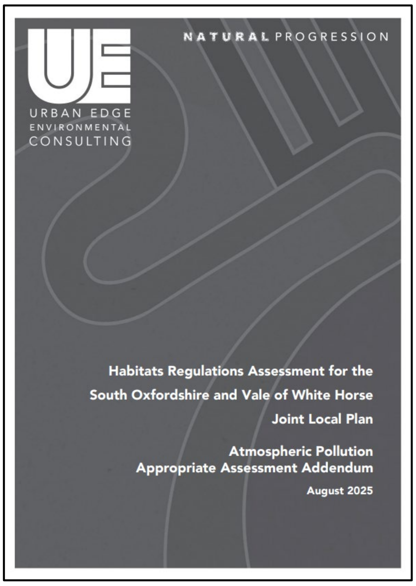
Cover note for the:

South Oxfordshire and Vale of White Horse Habitats Regulations Assessment (HRA) Addendum August 2025



This is an addendum to the Habitats Regulations Assessment Appropriate Assessment (AA) report for the South Oxfordshire and Vale of White Horse Joint Local Plan, December 2024 (examination library reference CSD04.1).

Summary of what this HRA Addendum covers

The AA report of December 2024 (examination library reference CSD04.1) considered a range of impact pathways by which policies in the Joint Local Plan could give rise to likely significant effects to European designated sites, either alone or in combination with other plans and projects. Of these impact pathways, the AA report concluded that only recreational disturbance impacts had the potential to result in likely significant effects to the Cothill Fen Special Area of Conservation (SAC) in the absence of mitigation. Adverse effects to integrity were subsequently discounted in light of provisions within Policy AS10 of the Joint Local Plan (Dalton Garden Village site allocation) to mitigate the effects of recreational disturbance.

Atmospheric pollution was also included as a possible impact pathway within the AA report. However, due to ongoing discussions with Natural England about the scope of traffic and air quality modelling, the December 2024 report did not draw any conclusions about the potential for likely significant atmospheric pollution effects. Instead, the report noted that an update [this Addendum] would be published once data from these modelling exercises was available. During 2025, work continued on the assessment of air quality impacts on Cothill Fen, Oxford Meadows and Aston Rowant SACs. This HRA Addendum explains the methodology used for the screening and Appropriate Assessment of atmospheric pollution impacts on these European designated sites and sets out the outcomes and conclusions.

Conclusion

Read together, the HRA Appropriate Assessment report (December 2024) and this Addendum (August 2025) conclude that the South Oxfordshire and Vale of White Horse Joint Local Plan 2041 is compliant with the Conservation of Habitats and Species Regulations 2017 (as amended), with regard to Aston Rowant, Chiltern Beechwoods, Cothill Fen, Hackpen Hill, Hartslock Wood, Kennet & Lambourn Floodplain, Little Wittenham, Oxford Meadows and River Lambourn SACs, for all impact pathways, including atmospheric pollution.

URBAN EDGE ENVIRONMENTAL CONSULTING

NATURAL PROGRESSION

Habitats Regulations Assessment for the South Oxfordshire and Vale of White Horse Joint Local Plan

Atmospheric Pollution Appropriate Assessment Addendum

August 2025

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Habitats Regulations Assessment for the South Oxfordshire and Vale of White Horse Joint Local Plan

Atmospheric Pollution Appropriate Assessment Addendum

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Abbreviations

AADT	Annual Average Daily Traffic
APIS	Air Pollution Information System
ha	hectare
HRA	Habitat Regulations Assessment
ha	hectare
HRA	Habitat Regulations Assessment
kg	kilogram
µg	Micrograms
m3	metres cubed
NH_3	Ammonia
NDep	Nitrogen Deposition
NOx	Nitrogen oxides
SAC	Special Area of Conservation
SSSI	Site of Special Scientific Interest
yr	Year

0 Executive Summary

0.1 Introduction

0.1.1 This report has been prepared for South Oxfordshire and Vale of White Horse District Councils (the Councils) as part of the Habitats Regulations Assessment (HRA) for the Joint Local Plan. The report serves as an Addendum to the Appropriate Assessment Report which was submitted alongside the Publication Joint Local Plan in December 2024.

0.1.2 This report relates solely to atmospheric pollution and provides an updated screening assessment and Appropriate Assessment. All other pathways of impact were covered in the December 2024 report. These included recreational disturbance, water quality and quantity, and site specific impacts. It was concluded that only recreational disturbance impacts had the potential to result in likely significant effects to the Cothill Fen Special Area of Conservation (SAC) but adverse effects to integrity were discounted in light of mitigation provisions within policy AS10 of the Joint Local Plan. These conclusions were agreed with Natural England through a Statement of Common Ground.

0.2 Scope of the Assessment

0.2.1 Three European sites have been considered for likely significant or adverse effects on integrity:

- Aston Rowant SAC;
- Cothill Fen SAC; and
- Oxford Meadows SAC.

0.2.2 The assessment is informed by traffic and air quality modelling to predict changes in pollutant levels associated with the implementation of the Joint Local Plan alone and in combination with other plans and projects. Habitat surveys have also been undertaken to establish the presence of qualifying features within the SACs and their potential exposure to increased emissions. The methodology has been agreed with Natural England through a series of meetings and published explanatory notes.

0.2.3 The Joint Local Plan itself will generate minimal additional traffic when compared with continuing with the current adopted South & Vale Local Plans. However, for the assessment of the Joint Local Plan 'alone', Natural England has advised that it is necessary to consider the effect of the emerging Joint Local Plan together with all unbuilt allocations contained in the adopted South & Vale Local Plans. Two key air quality calculations have therefore informed the updated screening assessment to consider whether the Joint Local Plan could result in likely significant effects at any of the three European sites and hence require Appropriate Assessment:

- The JLP Alone 1 calculation predicts the change in emissions associated with the change in traffic flows in 2041 caused by replacing South and Vale adopted Local Plans with the Joint Local Plan.
- The JLP Alone 2 calculation predicts the change in emissions associated with the change in traffic flows caused by the adopted South and Vale Local Plans together with the emerging Joint Local Plan plus the adopted plans of the other Oxfordshire districts and TEMPro outside Oxfordshire.

0.2.4 The JLP Alone 2 calculation significantly over-predicts the impact of the Joint Local Plan but was agreed with Natural England as the best way to consider the effect of the emerging Joint Local Plan together with all unbuilt allocations contained in the adopted South & Vale Local Plans using the available traffic data.

0.2.5 Cherwell District is the only other Oxfordshire authority whose emerging Local Plan has reached Regulation 19, so it has been agreed with Natural England that only the Cherwell emerging plan can form part of the in-combination assessment together with the South & Vale Joint Local Plan.

0.3 Updated Screening Assessment Findings

0.3.1 No likely significant effects at any of the three European sites are predicted as a result of replacing South and Vale adopted Local Plans with the Joint Local Plan (JLP Alone 1).

0.3.2 At Cothill Fen SAC, likely significant effects are predicted for 'JLP Alone 2' associated with ammonia along the Cothill Road.

0.3.3 At Oxford Meadows SAC, likely significant effects are predicted for 'JLP Alone 2' associated with nitrogen deposition alongside the A34 and the A40.

0.3.4 At Aston Rowant SAC, likely significant effects are predicted for 'JLP Alone 2' associated with ammonia, nitrogen oxides, nitrogen deposition and acid deposition alongside the M40.

0.3.5 The emerging Cherwell plan forecasts a reduction in traffic and therefore the predicted change in emissions in the in-combination scenario is below the 'JLP Alone 2'. As a result, no additional likely significant effects are predicted when the Joint Local Plan is considered in combination with other plans.

0.3.6 The Oxford Meadows SAC and the Aston Rowant SAC were taken forward for Appropriate Assessment.

0.4 Appropriate Assessment Findings

0.4.1 No adverse effects to the integrity of the Oxford Meadows SAC are predicted for the following reasons:

- Habitat surveys did not identify any existing signs of nutrient enrichment within the affected qualifying habitat despite baseline levels of pollutants exceeding the environmental benchmark;

- The SAC is currently in favourable condition despite baseline pollutant exceedances of the environmental benchmark and seasonal flooding is considered to be the key driver of nutrient balance within the qualifying habitat as opposed to air pollution;
- The total concentrations of pollutants modelled in the 'Future with JLP' are predicted to be less than current baseline levels associated with fleet turnover, including switching to hybrid and electric vehicles. There will not, therefore, be a net increase over time;
- The total concentrations of pollutants modelled for the 'Future with JLP' scenario are almost identical to the 'Future without JLP' scenario; and
- The impacts of the Joint Local Plan are significantly over-predicted in the 'Future with JLP' scenario as it also includes emissions associated with adopted plan growth in other Oxfordshire districts, as well as growth outside of Oxfordshire and allocations in the South and Vale adopted plans which have already been built out.

0.4.2 No effects to the Cothill Fen SAC are predicted as there is no qualifying habitat within the areas where pollutant concentrations have been modelled to exceed the screening threshold.

0.4.3 No adverse effects to the integrity of the Aston Rowant SAC are predicted for the following reasons:

- The total concentrations of pollutants modelled in the 'Future with JLP' are lower than the 'Future without JLP' scenario associated with the reductions in traffic along the M40 on account of deallocation of some sites in the Joint Local Plan;
- The total concentrations of pollutants modelled in the 'Future with JLP' are predicted to be less than current baseline levels associated with fleet turnover, including switching to hybrid and electric vehicles. There will not, therefore, be a net increase over time.
- The impacts of the Joint Local Plan are significantly over-predicted in the 'Future with JLP' scenario as it also includes emissions associated with adopted plan growth in other Oxfordshire districts, as well as growth outside of Oxfordshire and allocations in the South and Vale adopted plans which have already been built out;
- The area of qualifying habitats affected as a proportion of the qualifying habitats in the whole SAC is small;
- A significant stretch of the M40 is in cutting leading the air quality model to over-predict average concentrations; and
- The SAC is currently in favourable condition despite some baseline pollutant exceedances of the environmental benchmark.

0.5 Conclusions

0.5.1 In conclusion, no likely significant effects at any of the three European sites are predicted as a result of replacing the South and Vale adopted Local Plans with the Joint Local Plan.

0.5.2 When considering the Joint Local Plan together with all traffic growth from adopted Plans in Oxfordshire, as well as growth for the rest of the UK, there is potential for likely significant effects to the Oxford Meadows SAC, Cothill Fen SAC and Aston Rowant SAC and therefore these sites were taken forward for Appropriate Assessment.

0.5.3 However, taking account of a variety of factors including the over-prediction of effects associated with all traffic growth, adverse effects to the integrity of all three SACs have been ruled out.

0.5.4 The Joint Local Plan is considered to be compliant with the Habitats Regulations.

1 Introduction

1.1 Purpose of the Report

1.1.1 This report has been prepared for South Oxfordshire and Vale of White Horse District Councils (the Councils) as part of the Habitats Regulations Assessment (HRA) for the Joint Local Plan. The report serves as an Addendum to the Appropriate Assessment Report dated 5 December 2024 (UEEC, 2024) which was submitted alongside the Publication Joint Local Plan. This Addendum is supported by an Air Quality Modelling Technical Report which is provided as Appendix III.

1.2 HRA Background

1.2.1 The December 2024 Appropriate Assessment Report considered a range of impact pathways by which the Joint Local Plan's policies could give rise to likely significant effects to European designated sites either alone or in combination with other plans and projects. These impact pathways included: recreational disturbance; water quality and quantity; and site specific impacts, including habitat loss and construction / operational disturbance. Of these impact pathways it was concluded that only recreational disturbance impacts had the potential to result in likely significant effects to the Cothill Fen Special Area of Conservation (SAC) in the absence of mitigation. These impacts were therefore taken forward for Appropriate Assessment. Adverse effects to integrity were discounted in light of provisions within policy AS10 of the Joint Local Plan (Dalton Garden Village site allocation) to mitigate the effects of recreational disturbance.

1.2.2 Atmospheric pollution was also included as a possible impact pathway within the December 2024 Appropriate Assessment Report. However, on account of ongoing discussions with Natural England as regards to the scope of traffic and air quality modelling, the report did not draw any conclusions about the potential for likely significant atmospheric pollution effects. The report noted that an update would be published once data from these modelling exercises was available.

1.2.3 In December 2024 a Statement of Common Ground (SoCG) between South Oxfordshire and Vale of White Horse District Councils and Natural England noting the following:

> *"The parties agree that the South Oxfordshire and Vale of White Horse Joint Local Plan 2041 can be considered compliant with the Conservation of Habitats and Species Regulations 2017 (as amended), with regard to Aston Rowant SAC, Chiltern Beechwoods SAC, Cothill Fen SAC, Hackpen Hill SAC, Hartslock Wood SAC, Kennet & Lambourn Floodplain SAC, Little Wittenham SAC, Oxford Meadows SAC and River Lambourn SAC, for all impact pathways except for atmospheric pollution, on which further work will be undertaken."*

1.2.4 This report therefore provides an updated screening assessment and Appropriate Assessment of atmospheric pollution effects only.

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2 Methodology

2.1 Scope of Atmospheric Pollution Impacts

2.1.1 Section 5.2 of the December 2024 Appropriate Assessment Report explains the impact mechanisms through which air pollutants could result in likely significant effects to European sites. It cites the Natural England 2018 guidance which advises that if there are qualifying features of a European site within 200m of a road, and proposed development results in changes in annual average daily traffic flow (AADT) which exceed Design Manual for Roads and Bridges (DMRB) screening criteria[1] (1,000 vehicles or 200 heavy duty vehicles) or contributes more than 1% of the long-term critical load or level for the qualifying feature both alone and in-combination, then Appropriate Assessment is required. Natural England's guidance is clear that exceeding 1% of the critical load or level does not necessarily mean that there will be a likely significant effect, it is simply a trigger for when further assessment is needed.

2.1.2 Three European sites were scoped into the assessment which fall within 200m of the road network and have been the subject of traffic and air quality modelling:

- Aston Rowant SAC (M40);
- Cothill Fen SAC (Honeybottom Lane and Besselsleigh Road); and
- Oxford Meadows SAC (A34 and A40).

2.1.3 These locations are shown on Figures 5.1 and 5.2 of the December 2024 Appropriate Assessment Report. The air quality modelling identified a third location at the Oxford Meadows SAC where the 1% screening threshold was predicted to be exceeded: Godstow Road. This was not included in the original scope as the road does not form part of the strategic road network. However, in light of the air quality model predictions this location has been considered as part of the screening assessment in Chapter 3.

2.1.4 Table 5.3 on page 35 of the December 2024 Appropriate Assessment Report sets out the critical loads and levels applied in the assessment. For ease of reference, these are replicated in Table 2.1 and Table 2.2 of this report. The critical level for annual mean nitrogen oxides (NO_x) concentrations is set at the same concentration irrespective of the habitat features of interest. Critical loads are specific to different habitats types and are listed on the Air Pollution Information System (APIS, 2025). Critical loads for nitrogen deposition are published as ranges. This is because other factors influence how sensitive a habitat may be to additional nitrogen; for example, how a site is managed can affect its sensitivity to nitrogen deposition. To provide a worst-case assessment, this report has primarily focussed on the lower end of each critical load range. However, consideration has also been given to the upper end to provide additional information.

[1] The 2017 Wealden judgment has clarified that, if the DMRB screening criteria are used, they should be used to screen in-combination impacts as well as the project/plan alone.

2.1.5 There are two critical levels for ammonia (NH_3), with the lower value (1 µg/m3) applying only where lichens or bryophytes are present or form a key part of the ecosystem integrity. At Cothill Fen SAC where the qualifying habitats include alkaline fens and alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*, the 1 µg/m3 level has been applied. At Aston Rowant SAC, where the where the qualifying habitats include *Juniperus communis* formations on calcareous grasslands and *Asperulo-Fagetum* beech forests, the 3 µg/m3 level has been applied.

Table 2.1: Vegetation and Ecosystem Critical Levels

Pollutant	**Critical Level (µg/m3)**
Nitrogen oxides (NO_x)	30
Ammonia (NH_3)	1 or 3

Table 2.2: Vegetation and Ecosystem Critical Loads

European Site	**Nitrogen Deposition (kgN/ha/yr)**	**Acid Deposition 'N_{max}' (keq/ha/yr)**
Oxford Meadows	10 to 20	4.856
Aston Rowant – short semi-natural vegetation	10 to 20	4.856
Aston Rowant – woodland	10 to 15	1.905
Cothill Fen – short semi-natural vegetation	15 to 25	4.856
Cothill Fen – woodland	Not sensitive	4.856

2.2 Traffic and Air Quality Modelling

2.2.1 Two key documents form the basis of the traffic and air quality modelling approach agreed with Natural England:

1. HRA Methodology Paper April 2025 (South & Vale District Councils, 2025a); and
2. HRA Air Quality Modelling Non-Technical Briefing Note (South & Vale District Councils, 2025b).

2.2.2 Document 1 set out the proposed methodology for the assessment of atmospheric pollution impacts and was shared in draft with Natural England and other Oxfordshire local authorities on 24 January 2025. Following a meeting with Natural England to discuss its contents, some amendments were made, and the final version was issued to Natural England on 6 February 2025. Document 2 was produced to supplement the proposed methodology following an in-person meeting with Natural England and representatives from all Oxfordshire authorities on 26 February 2025. Both documents have been approved by Natural England and form the basis of the assessment, the results of which are presented in this report. The Non-Technical Briefing Note's contents supersede paragraphs 4.6-4.8 of the methodology paper and provide detail for the in-combination assessment as identified in paragraph 3.29. *Please note that these two documents supersede the earlier HRA Explanatory Note prepared collectively by the Oxfordshire Districts and the County Council (South & Vale District Councils, 2025c).*

Traffic modelling

2.2.3 The Joint Local Plan itself will generate minimal additional traffic when compared with continuing with the current adopted South & Vale Local Plans (and on some important roads it will reduce traffic). However, for the assessment of the Joint Local Plan 'alone', Natural England has advised that it is necessary to consider the effect of the emerging Joint Local Plan together with all unbuilt allocations contained in the adopted South & Vale Local Plans. Thus, while most air quality assessments consider the effect of a plan or project 'alone' as being the change that would be caused by adoption of that plan or project, Natural England's advice here is that the assessment 'alone' should combine the change that would be caused by adoption of the Joint Local Plan, with the residual effect of the adopted Plans.

2.2.4 The Oxfordshire Strategic Model (OSM) modelled the following scenarios:

- **Traffic 1**: 2018 Base Year.
- **Traffic 2**: 2041 with all the South & Vale **adopted plan allocations built out**, as well as adopted plan growth in other Oxfordshire districts and TEMPro[2] outside Oxfordshire.
- **Traffic 3**: 2041 with all the South & Vale **emerging Joint Local Plan allocations built out[3]**, as well as adopted plan growth in other Oxfordshire districts and TEMPro[4] outside Oxfordshire.

2.2.5 There are two key points about the traffic data which are important in understanding the framing of the air quality modelling:

- The modelled scenarios mean that it is not possible to separate out traffic associated with those site allocations in the adopted South & Vale plans built out to date, from traffic associated with those which still remain to be constructed; and
- Traffic associated with South and Vale adopted plan growth cannot be separated out from traffic associated with adopted plan growth in other Oxfordshire districts (Cherwell, Oxford City and West Oxfordshire).

2.2.6 Of the Oxfordshire authorities, South & Vale and Cherwell are the only ones whose plans have currently reached Regulation 19, so it has been agreed with Natural England that just these three authorities' local plans can form part of the in-combination assessment. The following scenario has therefore informed the assessment of in-combination atmospheric pollution effects:

- **Traffic 4**: 2041 with all the South & Vale emerging Joint Local Plan allocations built out, as well as adopted plan growth in other Oxfordshire districts and TEMPro outside Oxfordshire **and** Cherwell emerging plan growth.

[2] Trip End Model Presentation Program. This software is developed by the UK Department for Transport and uses data from the National Trip End Model.

[3] This includes adopted South & Vale plan allocations as amended by the emerging Joint Local Plan.

[4] *Ibid*

Air quality modelling

2.2.7 Air quality modelling has been carried out by Air Quality Consultants (AQC) to predict concentrations and deposition over an area extending 200m from each affected road which passes through a relevant designated site. Predictions have been made for:

- Annual mean nitrogen oxides (NOx) concentrations;
- Annual mean ammonia concentrations;
- Annual mean nutrient nitrogen deposition; and
- Annual mean acid deposition.

2.2.8 Full details of the air quality modelling methodology are provided in the Air Quality Modelling Technical Report in Appendix III, including details of the model used and model verification.

2.2.9 The air quality modelling separately ran each of the traffic datasets (Traffic 1 to Traffic 4). Table 4 in the Air Quality Modelling Technical Report (Appendix III) details all the scenarios used to predict total concentrations and deposition to the SACs. The total concentration or deposition is often called the 'Predicted Environmental Concentration' (PEC). The air quality impacts of the Joint Local Plan, alone and in combination, have been calculated by comparing the results of the various scenarios thereby calculating the predicted changes to concentrations and deposition, often called the 'Process Contribution' (PC). These calculations are set out in Table 5 of the Air Quality Modelling Technical Report (Appendix III) and replicated in Table 2.3 here.

Table 2.3: Summary of Predicted Changes to Concentrations and Deposition (PCs)

Process Contribution	Construction	Explanation
JLP Alone 1	Future with JLP (Traffic 3) ***minus*** Future without JLP (Traffic 2)	Change in traffic flows in 2041 caused by replacing South and Vale adopted Local Plans with the Joint Local Plan
JLP Alone 2	Future with JLP (Traffic 3) ***minus*** Future Zero Growth (Traffic 1)	Change in traffic flows caused by the adopted South and Vale Local Plans together with the emerging Joint Local Plan plus the adopted plans of the other Oxfordshire districts and TEMPro. In other words, to show the impact at 2041 of implementing the emerging Joint Local Plan when compared to a future with zero growth
In Combination 1	Future In Combination (Traffic 4) ***minus*** Future without JLP (Traffic 2)	Impact at 2041 of implementing the emerging Joint Local Plan and the emerging Cherwell plan, when compared to South & Vale adopted plan allocations built out, plus adopted plan growth in other

Process Contribution	Construction	Explanation
		Oxfordshire districts and TEMPro outside Oxfordshire
In Combination 2	Future In Combination (Traffic 4) ***minus*** Future Zero Growth (Traffic 1)	Impact at 2041 of implementing the emerging Joint Local Plan and emerging Cherwell plan, when compared to a future with zero growth.

2.2.10 ***It is important to note that JLP Alone 2 represents the entire forecast growth in traffic between 2018 and 2041, only some of which will be caused by unbuilt allocations in the existing Plans or by the Joint Local Plan. This will therefore overstate the effect of the Joint Local Plan and is therefore highly precautionary, particularly on strategic routes which carry traffic across the UK.***

2.2.11 It should also be noted that the only roads alongside European sites which are predicted to be affected by both the Joint Local Plan and the emerging Cherwell Local Plan are the A40 and the A34, and that the emerging Cherwell Plan is predicted to reduce traffic volumes on both of these roads. Therefore, the in-combination assessments are unusual in that they result in a smaller increase in traffic than the Joint Local Plan alone.

Receptors

2.2.12 The air quality model has predicted impacts at a series of transects alongside each affected road within 200m of the SAC. The locations of these transects are shown in Figure 2.1 to Figure 2.3. Within each transect, receptors have been placed at the following distances from the roads: 2m, 3m, 5m, 9m, 17m, 33m, 65m, 129m and 200m. In addition, a total of 88,000 receptors have been placed at various points in and around each SAC, using source-oriented grids at the same distances as the transects, and underlying Cartesian grids with spacing ranging from 18m to 50m and covering the full extent of each SAC. These additional receptors have been used to generate isopleths.

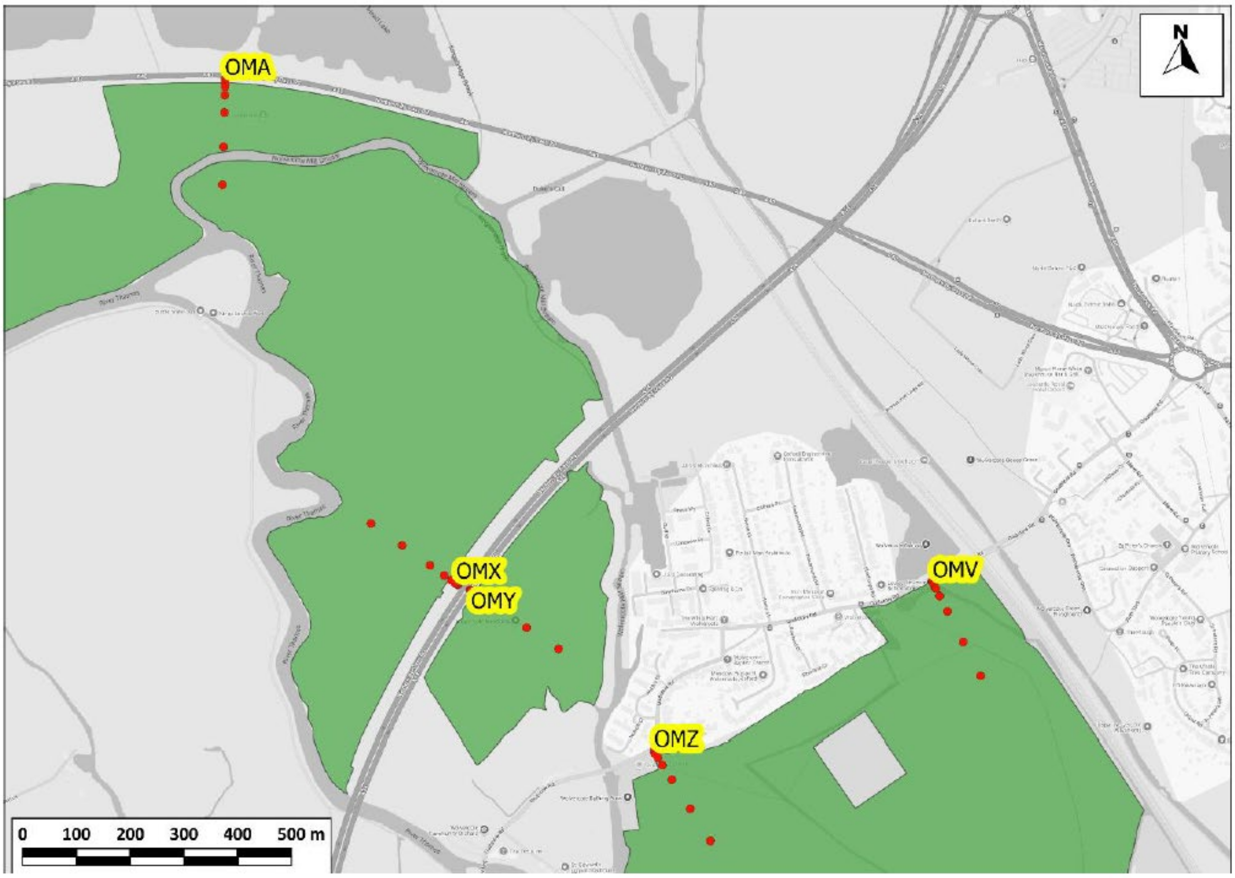

Figure 2.1: Receptor Transects at Oxford Meadows (SAC shown in green)

Figure 2.2: Receptor Transects at Aston Rowant (SAC shown in green)

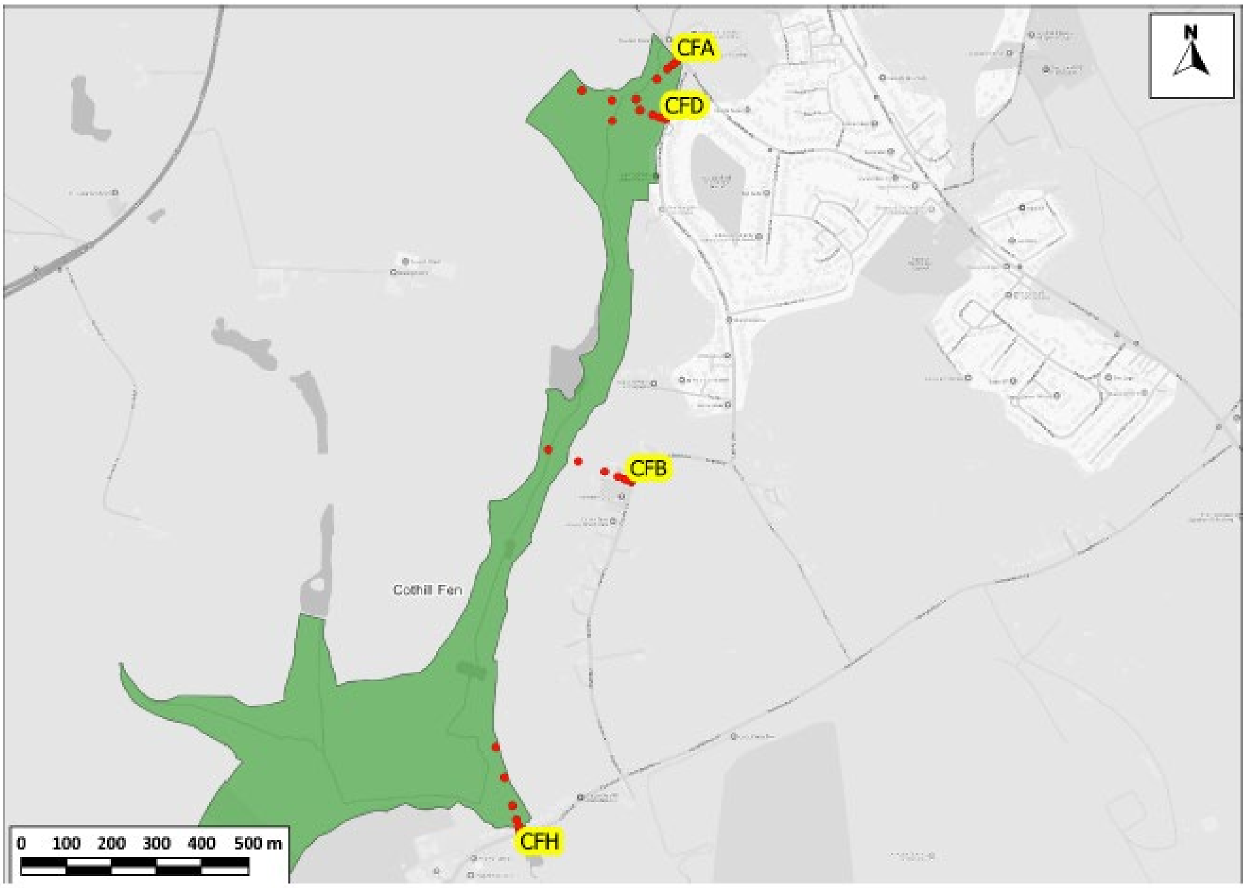

Figure 2.3: Receptor Transects at Cothill Fen (SAC shown in green)

2.3 Habitat Site Surveys

2.3.1 In order to inform the Appropriate Assessment of potential adverse effects to integrity, site surveys were undertaken at each of the three SACs. The surveys were undertaken over three days (6-8 May 2025) by an experienced ecologist (Richard Bickers BSc (Hons) PhD MCIEEM) with expertise in botanical survey. One day was devoted to each of the three SACs, Aston Rowant, Oxford Meadows and Cothill Fen, in that order.

2.3.2 The surveys were focused on areas where air quality modelling had predicted exceedances of 1% of the critical level / load, although areas outside these were also inspected in order to establish how well represented the qualifying features are across the SACs as a whole. The main aim of the surveys was to identify whether qualifying habitat(s), or potentially suitable habitats for qualifying species (creeping marshwort *Helosciadium (Apium) repens*), were present in the areas of modelled exceedance. Qualifying habitats were identified with reference to the Joint Nature Conservation Committee (JNCC) habitat descriptions and to the relevant National Vegetation Communities that are referenced within them. Identification of potentially suitable habitat for creeping marshwort was based on descriptions provided within the Botanical Society of the British Isles species account.

2.3.3 Other relevant observations, such as the presence of species or vegetation indicative of nutrient enrichment (eutrophication), and whether this appeared to be associated with proximity to roads, were also recorded.

2.3.4 The surveys were undertaken within the period optimal for such surveys and weather conditions were favourable. Access was obtained to all relevant areas of the SACs. There were no significant limitations to the surveys.

2.3.5 The survey findings are described in Appendix II. Figure 2.4 to Figure 2.8 provide a visual summary of the survey findings, setting out where qualifying features were identified within each of three SACs screened into the assessment.

South & Vale Joint Local Plan, Air Pollution Appropriate Assessment

Figure 2.4: Oxford Meadows SAC (Pixey Mead, Oxey Mead and Wolvercote Meadows) Habitat Survey Findings

Scale (at A4): 1:10,000 **Created by:** EM
Date: Jul 2025 **Reviewed by:** NP
Drawing number:
OxfordshireSAC_Airquality: Oxford Meadows: 250702

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Figure 2.5: Oxford Meadows SAC (Wolvercote Common) Habitat Survey Findings

Scale (at A4): 1:1,500 **Created by:** EM

Date: Jul 2025 **Reviewed by:** NP

Drawing number:

OxfordshireSAC_Airquality: Oxford Meadows: 250702

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Cothill Fen SAC

Figure 2.6: Cothill Fen SAC (north) Habitat Survey Findings

0 75 150
Metres

N

Scale (at A4): 1:3,000 **Created by:** EM
Date: Jul 2025 **Reviewed by:** NP
Drawing number:
OxfordshireSAC_Airquality: Cothill Fen: 250702

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Cothill Fen SAC

Cothill Fen - Mixed deciduous woodland

Cothill Fen - Qualifying habitat

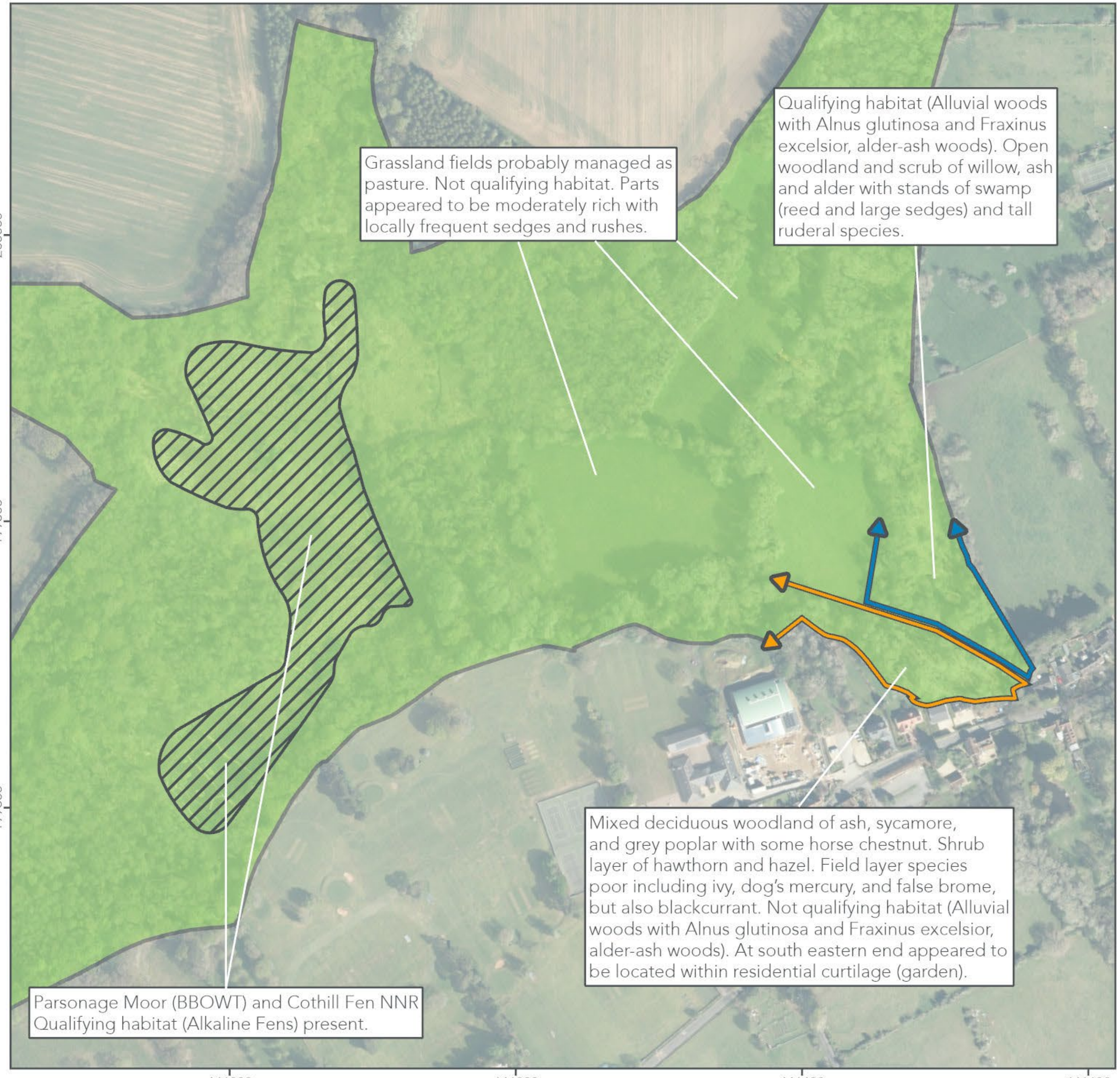

Figure 2.7: Cothill Fen SAC (south) Habitat Survey Findings

0 100 200

Metres

N

Scale (at A4): 1:4,000 **Created by:** EM

Date: Jul 2025 **Reviewed by:** NP

Drawing number:

OxfordshireSAC_Airquality: Cothill Fen: 250702

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Aston Rowant SAC

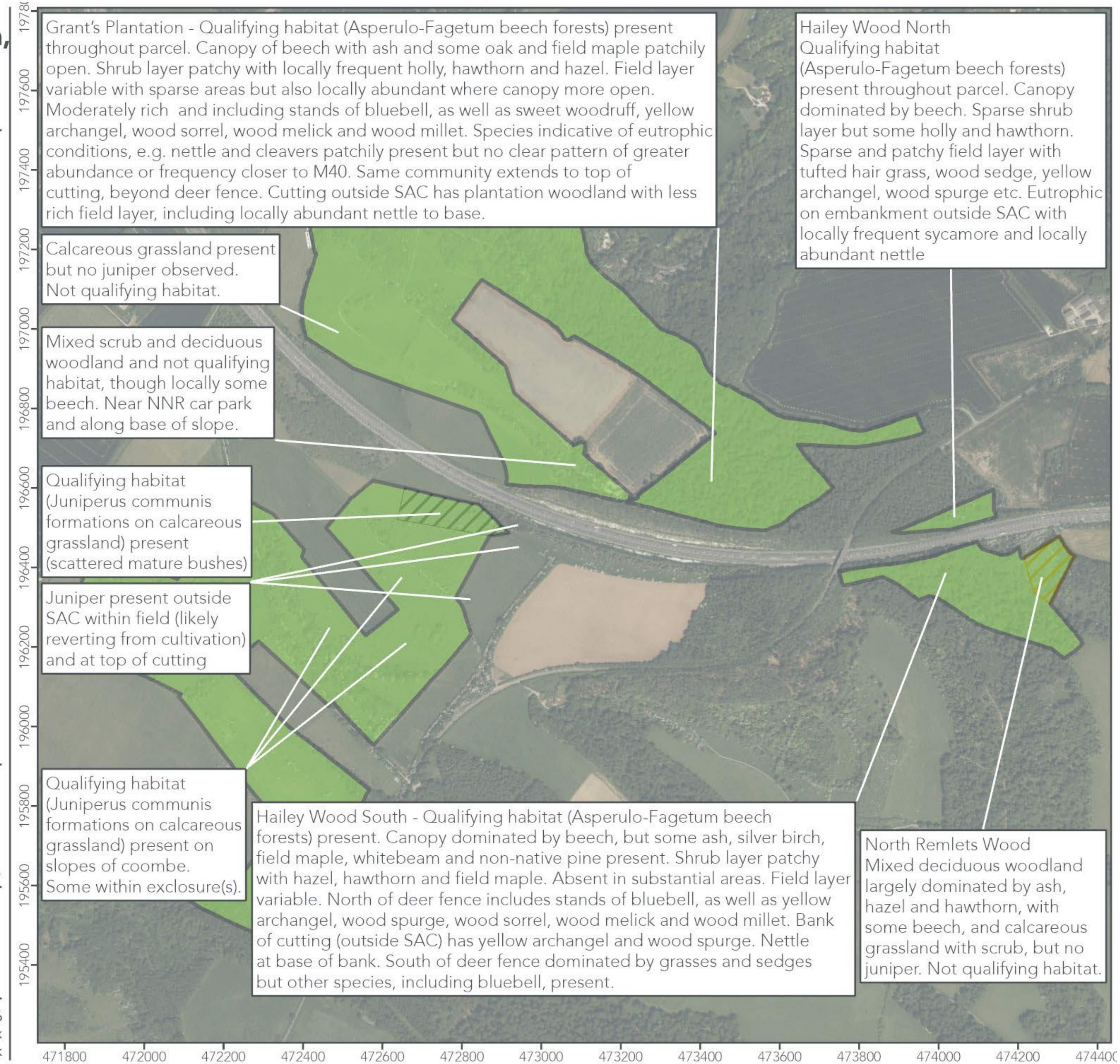

Figure 2.8: Aston Rowant SAC Habitat Survey Findings

0 350 700

Metres

N

Scale (at A4): 1:14,000 **Created by:** EM

Date: Jul 2025 **Reviewed by:** NP

Drawing number:

OxfordshireSAC_Airquality: Aston Rowant: 250702

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3 Screening Assessment

3.1 Introduction

3.1.1 The air quality modelling results have been used to inform an updated screening assessment. The screening threshold has been set at 1% of the critical level or load applicable for each pollutant at each designated site (Table 2.1 and Table 2.2) in line with Natural England's guidance (Natural England, 2018). Likely significant effects are discounted where the modelling predicts that the Joint Local Plan's Process Contribution (PC) alone and in combination is below the 1% threshold.

3.1.2 For those European sites where Natural England's Supplementary Advice sets an air quality target to "*Maintain as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System*", likely significant effects are also discounted where the 1% threshold is exceeded but the Predicted Environmental Concentration (PEC) is modelled to be below the applicable critical load or level. This is provided that current baseline levels of the pollutant in question do not exceed the relevant critical / load. In this case the pollutant has been treated as if a target of " restore" were in place as advised by Natural England[5]. Where the PEC is below the critical level / load but an air quality target of "restore" has been set in the Supplementary Advice, then further analysis is undertaken through the Appropriate Assessment.

3.1.3 Where the PC exceeds 1% of the critical level / load and the pollutants are taken forward for Appropriate Assessment, the areas where the 1% is exceeded are mapped in Appendix I. These relate to the JLP Alone 2 scenario only, as explained in the subsequent sections of this report. At Aston Rowant the qualifying juniper habitat is only present within the west of the SAC, and hence only the western part of the SAC is mapped. Similarly, qualifying beech forest habitat is only present within the east of the SAC, and hence only the eastern part of the SAC is mapped.

3.1.4 It is important to note that the assessment of the effects of the Joint Local Plan alone and in combination which follows is informed by the four air quality calculations set out in Table 2.3 at Natural England's request.

3.1.5 The JLP Alone 2 and the In Combination 2 calculations over-represent the impact of the emerging Joint Local Plan for two reasons:

1. Some of the site allocations in the South & Vale adopted plans (and neighbouring plans) will have already been built out since the base year of 2018; and
2. They include adopted plan growth from Cherwell, West Oxfordshire and Oxford City, as well as TEMPro growth for outside of Oxfordshire.

[5] Meeting between South & Vale District Councils and Natural England , 30/7/25, 3pm

3.2 Oxford Meadows SAC

Air quality targets for the Oxford Meadows SAC

3.2.1 The Supplementary Advice for Oxford Meadows (Natural England, 2019a) sets an air quality target of "maintain". The air quality modelling shows that baseline levels of ammonia and acid deposition did not exceed the critical level / critical load. However, for NOx and nitrogen deposition (grassland) the critical level / lower critical load was exceeded. The screening analysis which follows below, therefore assumes a "restore" air quality target for NOx and nitrogen deposition (grassland) is in place.

Screening analysis

3.2.2 For JLP Alone 1, the PC for all pollutants is not predicted to exceed 1% of the relevant critical level / load either alongside the A34 and A40, or alongside Godstow Road. **Likely significant effects associated with <u>JLP Alone 1</u> are therefore ruled out.**

3.2.3 For JLP Alone 2, the PC for acid deposition is not predicted to exceed 1% of the critical load either alongside the A34 and A40, or alongside Godstow Road. Likely significant acid deposition effects are therefore ruled out.

3.2.4 The PCs for NO_x and nitrogen deposition are predicted to be greater than 1% of the critical level / load under the JLP Alone 2 scenario, alongside the A34 and A40 and alongside Godstow Road, and alongside the A34 and A40 for ammonia.

3.2.5 However, for ammonia the PEC is predicted to be below the critical level and therefore likely significant effects are ruled out as the air quality target for ammonia at Oxford Meadows SAC is "maintain" for both qualifying features (Natural England, 2019a).

3.2.6 For NOx, whilst the PEC is also predicted to be below the critical level, likely significant effects cannot be screened out at this stage, as an air quality target of "restore" applies in line with Natural England's advice (see section 3.1.2).

3.2.7 For nitrogen deposition the PEC is predicted to fall between the lower and upper critical loads (10 to 20 kg/N/ha/yr). Under the JLP Alone 2 scenario, the habitat surveys identified lowland hay meadow qualifying habitat within the areas where nitrogen deposition is predicted to exceed 1% of the lower and upper critical load alongside the A34 and A40 in Pixey Mead, Oxey Mead and Wolvercote Meadows (Figure 2.4 and Figures AI.1 and AI.2 in Appendix I) and therefore there is considered to be potential for likely significant effects associated with nitrogen deposition at these locations.

3.2.8 Godstow Road runs along the northern edge of Port Meadow with Wolvercote Common & Green SSSI. Here creeping marshwort is the qualifying feature as opposed to lowland hay meadows. Whilst the habitat surveys identified potentially suitable habitat for creeping marshwort, that is, wet depressions with shallow standing water and patchy bare mud, the local abundance of invasive non-native Swamp stonecrop / New Zealand pigmy weed renders the area less suitable (Figure 2.5). The Oxford Meadows supplementary advice notes "*Apium repens* is a weak competitor and so is at risk of adverse impacts through the growth of more robust surrounding vegetation. The invasive New Zealand stonecrop *Crassula helmsii* is present on part of the site but it is not currently in the areas occupied by *Apium repens*. An ongoing programme of control is in place to contain the spread of this plant on site." (Natural England, 2019a) . The qualifying features description also notes that "*Port Meadow Apium repens is confined to a narrow ecological zone, associated with seasonally-inundated hollows in the middle and southern parts of the site.*". There is also no specific mention of creeping marshwort as a sensitive feature in the Natural England designated sites information for Unit 002 of the Port Meadows & Wolvercote Common & Green SSSI[6].

3.2.9 Other sources also note that creeping marshwort is now absent from Wolvercote Common and present only in the southern portion of Port Meadows which floods more frequently (Webb, 2014; Oxford City Council, no-date). Creeping marshwort has been monitored by members of the Rare Plants Group (RPG), now the Oxfordshire Flora Group (OFG) since 1996. Webb (2014) notes that no populations have been found on Wolvercote Common during this time they have been surveying.

3.2.10 On the basis that creeping marshwort is a weak competitor and invasive species were identified during the habitat surveys, together with accounts from Natural England and others that the species is present only in the middle and south of Port Meadows (outside of the areas where the 1% threshold is predicted to be exceeded), likely significant effects are ruled out along Godstow Road.

3.2.11 **On a precautionary basis, likely significant effects for JLP Alone 2 only associated with NOx and nitrogen deposition at the Oxford Meadows SAC alongside the A34 and the A40 are taken forward for Appropriate Assessment.**

In Combination Effects

3.2.12 For In-Combination 1, the PC for all pollutants is not predicted to exceed the 1% threshold either alongside the A34 and A40, or alongside Godstow Road.

3.2.13 For In-Combination 2, the PC for all pollutants is below JLP Alone 2 as there is a reduction in traffic associated with the emerging Cherwell Local Plan. Therefore, no additional likely significant effects are predicted in combination.

3.3 Cothill Fen SAC

Air quality targets for the Cothill Fen SAC

3.3.1 The Supplementary Advice for Cothill Fen (Natural England, 2016) sets an air quality target of "maintain" for the qualifying fen habitat. Air quality is not attributed to the qualifying alluvial forest habitat. APIS also notes that this habitat is not sensitive to NOx and nitrogen deposition effects.

[6] Natural England designated sites finder, Port Meadow with Wolvercote Common & Green SSSI - WOLVERCOTE COMMON (002)

3.3.2 The air quality modelling shows that baseline levels of NOx, nitrogen deposition (grassland) and acid deposition did not exceed the critical level / critical load (lower where a range applies). However, for ammonia the critical level was exceeded. The screening analysis which follows below, therefore assumes a "restore" air quality target for ammonia is in place.

Screening analysis

3.3.3 For JLP Alone 1, the PC for all pollutants is not predicted to exceed 1% of the relevant critical level / load. **Likely significant effects associated with JLP Alone 1 are therefore ruled out.**

3.3.4 This is also the case for JLP Alone 2 except in the case of ammonia. The ammonia PC is predicted to exceed 1% of the critical level in a very small section of the SAC at its southern extent along the Cothill Road (Honeybottom Lane, transect point CFH) (Figure AI.6 in Appendix I). Given that an air quality "restore" target is in place, ammonia effects are taken forward for Appropriate Assessment in line with Natural England's 2018 guidance.

3.3.5 There is no predicted exceedance of the 1% threshold above the critical level for ammonia at the northern end of the SAC along Besselsleigh Road.

3.3.6 **Likely significant effects to the Cothill Fen SAC for JLP Alone 2 are ruled out for all pollutants except ammonia along the Cothill Road which is taken forward for Appropriate Assessment**.

In Combination Effects

3.3.7 For In-Combination 1, the PC for all pollutants is not predicted to exceed the 1% threshold within the SAC. For In-Combination 2, the PC for all pollutants is equal to JLP Alone 2. Therefore, no additional likely significant effects are predicted in combination.

3.4 Aston Rowant SAC

Air quality targets for the Aston Rowant SAC

3.4.1 The Supplementary Advice for Cothill Fen (Natural England, 2019b) sets an air quality target of "restore" for both the qualifying juniper habitat and the qualifying beech habitat. The air quality modelling shows that baseline levels of ammonia and acid deposition (grassland) did not exceed the critical level / critical load. However, for NOx, nitrogen deposition (grassland and woodland), and acid deposition (woodland) the critical level / critical load (lower range where applicable) was exceeded. The screening analysis which follows below, therefore assumes a "restore" air quality target for NOx, nitrogen deposition and acid deposition (woodland) is in place. A "maintain" target is assumed for ammonia and acid deposition (grassland).

Screening analysis

3.4.2 For JLP Alone 1, the PC for all pollutants is not predicted to exceed 1% of the relevant critical level / load within the SAC. **Likely significant effects associated with JLP Alone 1 are therefore ruled out.**

3.4.3 For JLP Alone 2, the PC is predicted to exceed 1% of the relevant critical level / load for all pollutants. For ammonia and acid deposition (short vegetation) the PECs are predicted to be below the critical level / load and therefore likely significant effects are screened out given the "maintain" target. The PEC is also predicted to be below the critical level for NOx, however in light of the "restore" target for this pollutant, effects are taken forward for Appropriate Assessment together with nitrogen deposition and acid deposition (woodland).

3.4.4 Exceedances for all pollutants screened in are predicted to occur within areas where the qualifying features, *Asperulo-Fagetum* beech forests and *Juniperus communis* formations on calcareous grasslands, were identified during the habitat surveys to varying degrees (Figure 2.8 and Figures AI.7 to AI.11 in Appendix I).

3.4.5 **Likely significant effects to the Aston Rowant SAC for JLP Alone 2 only associated with NOx, nitrogen deposition and acid deposition (woodland) are taken forward for Appropriate Assessment.**

In Combination Effects

3.4.6 For In-Combination 1, the PC for all pollutants is not predicted to exceed the 1% threshold within the SAC.

3.4.7 For In-Combination 2, the PC for all pollutants is below JLP Alone 2 as there is a reduction in traffic associated with the emerging Cherwell Local Plan. Therefore, no additional likely significant effects are predicted in combination.

3.5 Screening Assessment Summary

3.5.1 No likely significant effects are predicted as a result of the change in air pollutants between the South & Vale adopted Local Plans and the emerging Joint Local Plan (**JLP 1 alone or in combination**).

3.5.2 When considering the change in air pollutants between the adopted South & Vale Local plans together with the emerging Joint Local Plan as well as adopted growth in neighbouring authorities, and a future with zero growth (JLP Alone 2), likely significant effects are predicted for certain pollutants at each of the three SACs.

3.5.3 Table 3.1 provides a summary of those pollutants at each European site predicted to result in likely significant effects, and hence which have been taken forward for Appropriate Assessment.

Table 3.1: JLP Alone 2 Screening Summary

Pollutant	Baseline levels compared to critical level (Cle) / load (Clo)	AQ target applied	PC compared to 1% threshold	PEC compared to Cle/lo where maintain target is in place	JLP Alone 2 screening conclusion
Oxford Meadows SAC					
NOx	> Cle	Restore	PC > 1%	n/a	Restore + PC > 1%, LSE screened in
Ammonia	< Cle	Maintain	PC > 1%	PEC < Cle	PC >1% but PEC < Cle, LSE screened out
N Dep (grassland)	> Clo	Restore	PC > 1%	n/a	Restore + PC > 1%, LSE screened in
Acid dep (grassland)	< Clo	Maintain	PC<1%	Not req, PC < 1%	PC < 1%, LSE screened out
Cothill Fen SAC					
NOx	< Cle	Maintain	PC < 1%	Not req, PC < 1%	PC < 1%, LSE screened out
Ammonia	> Cle	Restore	PC > 1%	n/a	Restore + PC > 1%, LSE screened in
N Dep (woodland)	Not sensitive				
N Dep (grassland)	< Cle	Maintain	PC < 1%	Not req, PC < 1%	PC < 1%, LSE screened out
Acid dep (woodland)	< Cle	Maintain	PC < 1%	Not req, PC < 1%	PC < 1%, LSE screened out
Acid dep (grassland)	< Cle	Maintain	PC < 1%	Not req, PC < 1%	PC < 1%, LSE screened out
Aston Rowant SAC					
NOx	> Cle	Restore	PC > 1%	n/a	Restore + PC > 1%, LSE screened in
Ammonia	< Cle	Maintain	PC > 1%	PEC < Cle	PC > 1% but PEC < Cle, LSE screened out

Pollutant	Baseline levels compared to critical level (Cle) / load (Clo)	AQ target applied	PC compared to 1% threshold	PEC compared to Cle/lo where maintain target is in place	JLP Alone 2 screening conclusion
N Dep (woodland)	> Clo	Restore	PC > 1%	n/a	Restore + PC > 1%, LSE screened in
N Dep (grassland)	> Clo	Restore	PC > 1%	n/a	Restore + PC > 1%, LSE screened in
Acid dep (woodland)	> Clo	Restore	PC > 1%	n/a	Restore + PC > 1%, LSE screened in
Acid dep (grassland)	< Clo	Maintain	PC > 1%	PEC < Clo	PC > 1% but PEC < Clo, LSE screened out

4 Appropriate Assessment

4.1 Introduction

4.1.1 The following sections use the air quality modelling data and the habitat survey information to make a series of analyses about the modelled pollutant levels within the three SACs guided by Natural England's guidance (Natural England, 2018). The following factors are considered:

- Spatial extent of impact / exposure of qualifying features;
- Predicted Environmental Concentration (PEC) (total concentrations);
- Source attribution across the SAC as a whole;
- SAC condition; and
- Topography.

4.1.2 Following on from this, the Appropriate Assessment against each of the SAC conservation objectives is tabulated at the end of each section.

4.2 Oxford Meadows SAC

4.2.1 The screening assessment identified the potential for likely significant effects to areas of qualifying lowland hay meadows habitat within the Oxford Meadows SAC alongside the A34 (north and south) and along the south side of the A40 associated with **nitrogen deposition and NOx in the JLP Alone 2 scenario only**. Figure 2.4 shows the areas where the presence of lowland hay meadow habitat was identified during the site surveys.

Spatial extent of impact / exposure of qualifying features

4.2.2 The following paragraphs describe how far the PC's exceedance of the 1% threshold extends beyond the edge of the A34 and the A40, and hence the area of qualifying habitat exposed to this exceedance. Table 4.1 and Table 4.2 present the transect data for nitrogen deposition and NOx highlighting where the 1% threshold is exceeded and where qualifying habitat is present.

Nitrogen deposition

4.2.3 The critical load range for nitrogen deposition to lowland hay meadow habitat, identified on APIS, is 10 to 20 kgN/ha/yr. Figures AI.1 and AI.2 in Appendix I identify the extent of the areas where levels of nitrogen deposition exceed 1% above the lower and upper end of the critical load range along the A40 and A34 respectively.

4.2.4 On the north side of the A34 within Pixey Mead, the SAC boundary starts approximately 22m from the edge of A34 carriageway. The qualifying lowland hay meadows habitat is then set back from the SAC boundary by approximately 7m, with intervening coarser and less rich vegetation at the base of the A34 embankment (Figure 2.4). The air quality modelling transect data (OMX) predicts a PC (JLP Alone 2) of 0.26 kgN/ha/yr 33m from the edge of the A34 carriageway (Table 4.1). This drops below 1% of the lower critical load (1 kgN/ha/yr) around 77m from the edge of the A34 carriageway and 48m from the start of the lowland hay meadow habitat. The area of lowland hay meadow habitat within the SAC predicted to experience an increase in nitrogen deposition above 1% of the lower critical load on the north side of the A34 is approximately 3.7ha.

4.2.5 On the south side of the A34 within Wolvercote Meadows, the SAC boundary starts approximately 12m from the edge of the A34 carriageway. Where present, the lowland hay meadows habitat starts at the SAC boundary. The air quality modelling transect data (OMY) predicts a PC (JLP Alone 2) of 0.97 kgN/ha/yr at 9m from the edge of the A34 carriageway (Table 4.1). This drops below 1% of the lower critical load around 95m from the edge of the A34 carriageway and 83m from the start of the lowland hay meadow habitat. The area of lowland hay meadow habitat within the SAC predicted to experience an increase in nitrogen deposition above 1% of the lower critical load is approximately 2.4ha.

4.2.6 On the south side of the A40 in Oxey Mead, the SAC boundary starts approximately 10m from the edge of the A40 carriageway. The qualifying lowland hay meadows habitat is then set back from the SAC boundary by approximately 6m, with intervening coarser and less rich vegetation (Figure 2.4). The air quality modelling transect data (OMA) predicts a PC (JLP Alone 2) of 0.29 kgN/ha/yr 17m from the edge of the A40 carriageway (Table 4.1). This drops below 1% of the lower critical load around 60m from the edge of the A40 carriageway and 44m from the start of the lowland hay meadow habitat. The area of lowland hay meadow habitat within the SAC predicted to experience an increase in nitrogen deposition above 1% of the lower critical load is approximately 2.1ha.

4.2.7 Overall, an area of approximately 8.1ha of qualifying lowland hay meadows habitat within the SAC is predicted to experience an increase in nitrogen deposition levels above 1% of the lower critical load. This represents approximately 10% of the total area of lowland hay meadow habitat within the Oxford Meadows SAC.

Table 4.1: Oxford Meadows Transect Data: Nitrogen Deposition (short vegetation) Process Contribution JLP Alone 2

	NDep (short veg) Process Contribution – JLP Alone 2 (kgN/ha/yr)		
Distance from edge of road (m)	**Transect OMA (A40 south side)**	**Transect OMX (A34 north side)**	**Transect OMY (A34 south side)**
2	**0.99**	**1.58**	**2.00**
3	**0.87**	**1.40**	**1.74**
5	**0.69**	**1.14**	**1.39**
9	**0.49**	**0.81**	**0.97**
17	**0.29**	**0.50**	**0.58**
33	**0.15**	**0.26**	**0.29**
65	0.07	**0.12**	**0.14**
129	0.03	0.05	0.06
200	0.02	0.03	0.03
Screening criterion 1% of CLo	**0.1 (lower) to 0.2 (upper)**		

*Exceedances of the 1% criterion (lower CLo) are shown in **bold**. Those points falling within the SAC and where qualifying lowland hay meadow habitat is present are highlighted in yellow.*

Nitrogen oxides

4.2.8 The critical level for NOx is 30 µgm3. Figures AI.4 and AI.5 in Appendix I identify the extent of the areas where levels of NOx exceed 1% above the critical level along the A40 and A34 respectively.

4.2.9 On the north side of the A34 within Pixey Mead, the air quality modelling transect data (OMX) predicts a PC (JLP Alone 2) of 0.66 µgm3 33m from the edge of the A34 carriageway (Table 4.2). This drops below 1% of the critical level (0.3 µgm3) around 98m from the edge of the A34 carriageway and 69m `from the start of the lowland hay meadow habitat. The area of lowland hay meadow habitat within the SAC predicted to experience an increase in NOx above 1% of the critical level on the north side of the A34 is approximately 5.0ha.

4.2.10 On the south side of the A34 within Wolvercote Meadows, the air quality modelling transect data (OMY) predicts a PC (JLP Alone 2) of 1.34 µgm3 at 9m from the edge of the A34 carriageway (Table 4.2). This drops below 1% of the critical level around 90m from the edge of the A34 carriageway and 78m from the start of the lowland hay meadow habitat. The area of lowland hay meadow habitat within the SAC predicted to experience an increase in NOx above 1% of the critical level on the south side of the A34 is approximately 2.7ha.

4.2.11 On the south side of the A40 in Oxey Mead, the air quality modelling transect data (OMA) predicts a PC (JLP Alone 2) of 0.78 µgm3 17m from the edge of the A40 carriageway (Table 4.2). This drops below 1% of the critical level around 66m from the edge of the A40 carriageway and 50m from the start of the lowland hay meadow habitat. The area of lowland hay meadow habitat within the SAC predicted to experience an increase in NOx above 1% of the critical level is approximately 3.5ha.

4.2.12 Overall, an area of approximately 11.2ha of qualifying lowland hay meadows habitat within the SAC is predicted to experience an increase in NOx levels above 1% of the critical level. This represents approximately 14% of the total area of lowland hay meadow habitat within the Oxford Meadows SAC.

Table 4.2: Oxford Meadows Transect Data: Nitrogen Oxides Process Contribution JLP Alone 2

	NOx Process Contribution – JLP Alone 2 (µgm3)		
Distance from edge of road (m)	**Transect OMA (A40 south side)**	**Transect OMX (A34 north side)**	**Transect OMY (A34 south side)**
2	**1.42**	**1.66**	**1.90**
3	**1.33**	**1.57**	**1.78**
5	**1.20**	**1.43**	**1.60**
9	**1.01**	**1.22**	**1.34**
17	**0.78**	**0.95**	**1.02**
33	**0.54**	**0.66**	**0.69**
65	**0.33**	**0.41**	**0.43**
129	0.20	0.23	0.24
200	0.14	0.16	0.16
Screening criterion 1% of CLe	**0.3**		

Exceedances of the 1% criterion are shown in ***bold.*** *Those points falling within the SAC* <u>*and*</u> *where qualifying lowland hay meadow habitat is present are highlighted in yellow.*

Predicted Environmental Concentrations (PEC) / total concentrations

4.2.13 For NOx, current baseline levels exceed the critical level within qualifying hay meadow habitat alongside the A34 only. However, the PEC for the 'Future with JLP' scenario within all areas modelled within 200m of the carriageway falls below the critical level and significantly below the current baseline. This is associated with fleet turnover, including switching to hybrid and electric vehicles. NOx associated with the JLP will therefore have no impact on the achievement of the "restore" target for NOx.

4.2.14 Current baseline nitrogen deposition levels within qualifying hay meadow habitat within the SAC alongside both the A34 and the A40 fall between the upper and lower critical loads. Both alongside the A34 and the A40 the PEC for the 'Future with JLP' scenario remains less than the current baseline. Notably the PEC for the 'Future with JLP' scenario is almost identical to the 'Future without JLP' scenario. The PEC in both scenarios falls within the upper and lower critical loads for the lowland hay meadow habitat type, but below current baseline levels. There will not, therefore, be a net increase over time. Air quality will continue to improve over time regardless of whether the Joint Local Plan is adopted. This is associated with fleet turnover, including switching to hybrid and electric vehicles. The assessed traffic growth can be seen as retarding this improvement rather than generating a net adverse change (see section 4 of the Air Quality Technical Report (Appendix III)).

4.2.15 These exceedances must be viewed in the context that the 'Future with JLP' scenario includes emissions associated with adopted plan growth from Cherwell, West Oxfordshire and Oxford City, as well as TEMPro growth for outside of Oxfordshire plus allocations in the South & Vale adopted plans (and neighbouring plans) which have already been built out since the base year of 2018, and hence is considered to significantly over-predict the impact of the Joint Local Plan. The A40 and the A34 are also strategic routes carrying traffic across the UK. Therefore, the contribution of the Joint Local Plan is considered to be very minimal.

4.2.16 This assessment is supported by source attribution information from APIS for background levels of nitrogen deposited onto Oxford Meadows SAC. APIS data show that, in 2018 across the SAC, of local sources, road emissions contributed just 9.49% of total nitrogen deposition at the SAC and that road emissions are on a declining background trend (Figure 4.1). Of the combined UK sources, road emissions contributed 9.51% and are also on a declining background trend (Figure 4.2) (APIS, 2025).

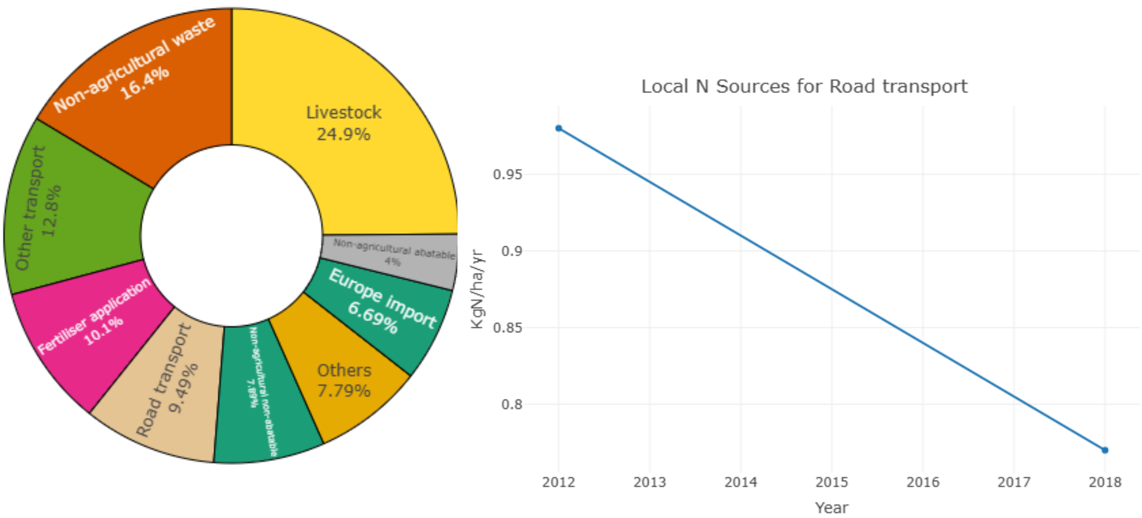

Figure 4.1: Oxford Meadows SAC: Local Contributions to Nitrogen Deposition (kgN/ha/yr) from Sources (UK) and Local Source Attribution Trends 2012 to 2018 (APIS, 2025)

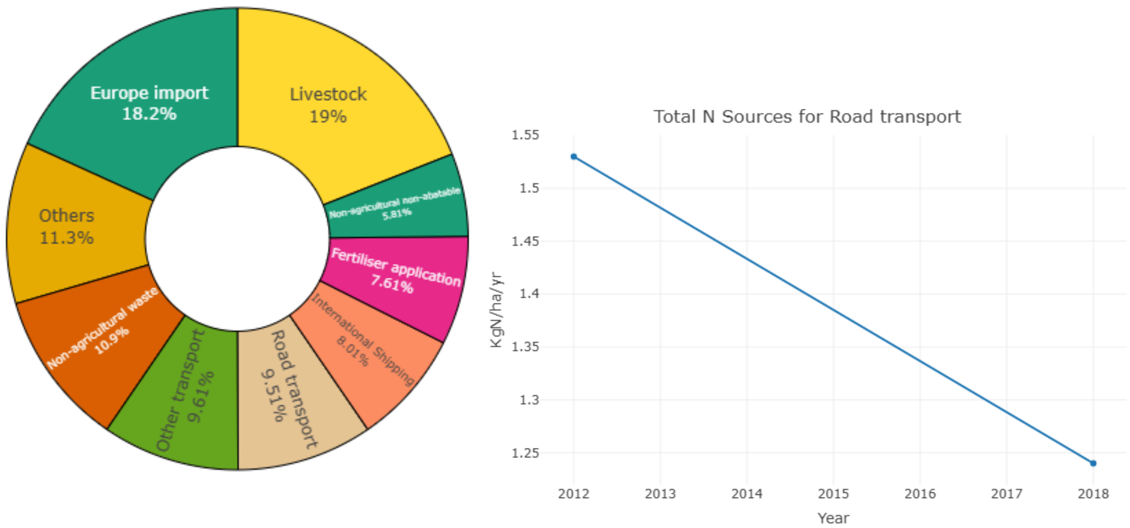

Figure 4.2: Oxford Meadows SAC – Combined UK Sources Contributions to Nitrogen Deposition (kgN/ha/yr) and Total Source Attribution Trends 2012 to 2018 (APIS, 2025)

SAC condition

4.2.17 The latest condition assessments at the Pixey and Yarnton Meads SSSI were undertaken in 2020. At the Wolvercote Meadows SSSI, the date is 2010. At both SSSIs lowland neutral grassland habitat was found to be in favourable condition (Natural England, 2025). Figure 3.2 in the December 2024 Appropriate Assessment report displays these condition assessments.

4.2.18 During the habitat surveys, there was no evidence of nitrogen enrichment to the lowland hay meadow habitat within those areas predicted to exceed the 1% threshold, or within the wider SAC where lowland hay meadows are found (Pixey and Yarnton Meads SSSI and Wolvercote Meadows SSSI) (Appendix II). The absence of signs of nitrogen enrichment pollutant damage to the lowland hay meadow habitat also indicate that the existing management regime of grazing and hay-cutting consistently removes nitrogen from the habitat contributing to the maintenance of concentrations and deposition of air pollutants. Natural England's Supplementary Advice for the Oxford Meadows SAC (Natural England, 2019a) explains that existing management measures, including grazing, hay cutting, and management of hedgerows, should be maintained to maintain the structure, functions and supporting processes associated with the lowland hay meadow qualifying habitat.

4.2.19 The flooding regime also plays an important role in maintaining the nutrient balance and hence the structure and function of the qualifying lowland hay meadow habitat. Natural England's Supplementary Advice for the site (Natural England, 2019a) notes that "*too little flooding may compromise the necessary management due to reduced nutrient inputs which will reduce hay yields making hay management less viable and sustainable, whilst summer flooding may prevent hay cutting and grazing.*". Seasonal flooding and the associated regular input of nutrients is therefore considered to be a key component of maintaining favourable conservation status with the Oxford Meadows SAC.

Appropriate Assessment

4.2.20 In light of the analysis above, Table 4.3 and Table 4.4 provide an assessment of impacts against each of the Oxford Meadow SAC conservation objectives to establish potential for adverse effects to the integrity of the site associated with NOx and nitrogen deposition respectively.

Table 4.3: Oxford Meadows Appropriate Assessment: Nitrogen Oxides

Assessment of impacts on the Oxford Meadows SAC Conservation Objectives
The extent and distribution of qualifying natural habitats and habitats of the qualifying species The extent and distribution of the lowland hay meadows qualifying habitats within the Oxford Meadows site **will not be significantly or adversely affected** by increased levels of NOx associated with the Joint Local Plan alone or in combination.
The structure and function (including typical species) of qualifying natural habitats The structure and function of lowland hay meadows qualifying habitats within the Oxford Meadows site **will not be significantly or adversely affected** by increased levels of NOx associated with the Joint Local Plan alone or in combination.
The structure and function of the habitats of the qualifying species Creeping marshwort is confined to the Port Meadow with Wolvercote Common & Green SSSI. However, sources note that the species only occurs in the southern portion of the site which floods more regularly and not in Wolvercote Common immediately south of Godstow Road. There is also no specific mention of creeping marshwort as a sensitive feature in the Natural England designated sites information for Unit 002 of the Port Meadows & Wolvercote Common & Green SSSI[7]. The habitat surveys also identified that the areas of the SSSI along the Godstow Road where the 1% threshold is exceeded are less suitable for creeping marshwort on account of the local abundance of invasive non-native Swamp stonecrop / New Zealand pigmy weed; creeping marshwort is a weak competitor. Therefore, the structure and function of the habitats of the qualifying species **will not be significantly or adversely affected** by increased levels of NOx associated with the Joint Local Plan alone or in combination.
The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely Lowland hay meadows are considered sensitive to changes in air quality, with potential for modifications to chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated (Natural England, 2019a). The modelled PEC for the 'Future with JLP' scenario shows NOx levels below the critical level and significantly below the current baseline. This is associated with fleet turnover, including switching to hybrid and electric vehicles. NOx associated with the JLP will therefore have no impact on the achievement of the "restore" target for NOx. On this basis, it is concluded that the supporting processes on which the qualifying lowland hay meadows habitats rely **will not be significantly or adversely affected** by increased levels of NOx associated with the Joint Local Plan alone or in combination.

[7] Natural England designated sites finder, Port Meadow with Wolvercote Common & Green SSSI - WOLVERCOTE COMMON (002)

Assessment of impacts on the Oxford Meadows SAC Conservation Objectives
The populations of each of the qualifying species ***The distribution of qualifying species within the site*** Creeping marshwort is confined to the Port Meadow with Wolvercote Common & Green SSSI. However, sources note that the species only occurs in the southern portion of the site which floods more regularly and not in Wolvercote Common immediately south of Godstow Road. There is also no specific mention of creeping marshwort as a sensitive feature in the Natural England designated sites information for Unit 002 of the Port Meadows & Wolvercote Common & Green SSSI[8]. The habitat surveys also identified that the areas of the SSSI along the Godstow Road where the 1% threshold is exceeded are less suitable for creeping marshwort on account of the local abundance of invasive non-native Swamp stonecrop / New Zealand pigmy weed; creeping marshwort is a weak competitor. Therefore, populations of creeping marshwort and the distribution of creeping marshwort **will not be significantly or adversely affected** by increased levels of NOx associated with the Joint Local Plan alone or in combination.

Table 4.4: Oxford Meadows Appropriate Assessment: Nitrogen Deposition (Grassland)

Assessment of impacts on the Oxford Meadows SAC Conservation Objectives
The extent and distribution of qualifying natural habitats and habitats of the qualifying species The extent and distribution of the lowland hay meadows qualifying habitats within the Oxford Meadows site **will not be significantly or adversely affected** by increased levels of nitrogen deposition associated with the Joint Local Plan alone or in combination.
The structure and function (including typical species) of qualifying natural habitats The structure and function of lowland hay meadows qualifying habitats within the Oxford Meadows site **will not be significantly or adversely affected** by increased levels of nitrogen deposition associated with the Joint Local Plan alone or in combination.
The structure and function of the habitats of the qualifying species Creeping marshwort is confined to the Port Meadow with Wolvercote Common & Green SSSI. However, sources note that the species only occurs in the southern portion of the site which floods more regularly and not in Wolvercote Common immediately south of Godstow Road. The habitat surveys also identified that the areas of the SSSI along the Godstow Road where the 1% threshold is exceeded are less suitable for creeping marshwort on account of the local abundance of invasive non-native Swamp stonecrop / New Zealand pigmy weed; creeping marshwort is a weak competitor. Therefore, the structure and function of the habitats of the qualifying species **will not be significantly or adversely affected** by increased levels of nitrogen deposition associated with the Joint Local Plan alone or in combination.
The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely Lowland hay meadows are considered sensitive to changes in air quality, with potential for modifications to chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated (Natural England, 2019a). An area of lowland hay meadow habitat within the SAC of approximately 8.1ha (representing approximately 10% of the total amount of this habitat within the SAC) is predicted to be exposed to nitrogen deposition loads exceeding 1% of the lower critical load.

[8] Natural England designated sites finder, Port Meadow with Wolvercote Common & Green SSSI - WOLVERCOTE COMMON (002)

Assessment of impacts on the Oxford Meadows SAC Conservation Objectives
Baseline levels of nitrogen deposition alongside the A34 and A40 within the SAC fall within the upper and lower critical loads for lowland hay meadows. No evidence of nitrogen enrichment was identified during the habitat surveys, likely on account of the existing management regime of grazing and hay-cutting consistently removing nitrogen from the habitat. The SSSIs are also in favourable condition. Seasonal flooding is a key component of favourable condition status and is considered to outweigh the importance of nutrient inputs from air pollution, and specifically pollutants from road transport. Both alongside the A34 and the A40, the PEC for the 'Future with JLP' scenario remains less than the current baseline. This is associated with fleet turnover, including switching to hybrid and electric vehicles. The PEC for the 'Future with JLP' scenario is almost identical to the 'Future without JLP' scenario, indeed traffic flows along the A34 and the A40 are predicted to be lower in the 'Future with JLP' scenario. It is also highly relevant that, in addition to emissions from the Joint Local Plan, the 'Future with JLP' scenario also includes emissions associated adopted plan growth from Cherwell, West Oxfordshire and Oxford City, as well as TEMPro growth for outside of Oxfordshire as well as allocations in the South & Vale adopted plans (and neighbouring plans) which have already been built out since the base year of 2018. Therefore, this scenario is considered to significantly over-predict the impact of the Joint Local Plan. The A40 and the A34 are also strategic routes carrying traffic across the UK and therefore, the contribution of the Joint Local Plan is considered to be very minimal. On this basis, it is concluded that the supporting processes on which the qualifying lowland hay meadows habitats rely **will not be significantly or adversely affected** by increased levels of nitrogen deposition associated with the Joint Local Plan alone or in combination.
The populations of each of the qualifying species ***The distribution of qualifying species within the site*** Creeping marshwort is confined to the Port Meadow with Wolvercote Common & Green SSSI. However, sources note that the species only occurs in the southern portion of the site which floods more regularly and not in Wolvercote Common immediately south of Godstow Road. The habitat surveys also identified that the areas of the SSSI along the Godstow Road where the 1% threshold is exceeded are less suitable for creeping marshwort on account of the local abundance of invasive non-native Swamp stonecrop / New Zealand pigmy weed; creeping marshwort is a weak competitor. Therefore, populations of creeping marshwort and the distribution of creeping marshwort **will not be significantly or adversely affected** by increased levels of nitrogen deposition associated with the Joint Local Plan alone or in combination.

4.3 Oxford Meadows Conclusion

4.3.1 No likely significant air pollution effects to Oxford Meadows SAC are predicted in the **JLP Alone 1 scenario** which represents the effect of adopting the Joint Local Plan (when compared with the alternative of not adopting the Joint Local Plan). This is because the Joint Local Plan itself will generate minimal additional traffic when compared with continuing with the current adopted South & Vale Local Plans (and on some important roads it will reduce traffic).

4.3.2 Likely significant effects cannot be discounted in the **JLP Alone 2 scenario** associated with **nitrogen deposition and NOx**. This scenario has been modelled because Natural England has advised that it is necessary to consider the effect of the emerging Joint Local Plan together with all unbuilt allocations contained in the adopted South & Vale Local Plans. Due to traffic data availability, the JLP Alone 2 scenario also includes all the South & Vale emerging Joint Local Plan allocations built out, as well as adopted plan growth in other Oxfordshire districts and TEMPro outside Oxfordshire.

4.3.3 The Appropriate Assessment of effects in the 'Future with JLP' scenario concludes **no adverse effects to the integrity of the Oxford Meadows SAC** for the following reasons:

- Habitat surveys did not identify any existing signs of nutrient enrichment within the affected qualifying lowland hay meadow habitat despite baseline loading of nitrogen deposition sitting between the lower and upper critical load, and baseline levels of NOx exceeding the critical level;
- The SAC is currently in favourable condition despite baseline exceedances and seasonal flooding is considered to be the key driver of nutrient balance within the qualifying habitat as opposed to air pollution;
- The total concentrations of NOx modelled in the 'Future with JLP' are predicted to be below the critical level and significantly below the current baseline;
- The total concentrations of nitrogen deposition modelled in the 'Future with JLP' are predicted to be less than current baseline levels. There will not, therefore, be a net increase over time. This is associated with fleet turnover, including switching to hybrid and electric vehicles;
- The total concentrations of nitrogen deposition modelled for the 'Future with JLP' scenario are almost identical to the 'Future without JLP' scenario, indeed traffic flows along the A34 and the A40 are predicted to be lower in the 'Future with JLP' scenario; and
- The impacts of the Joint Local Plan are significantly over-predicted in the 'Future with JLP' scenario as it also includes emissions associated with adopted plan growth in other Oxfordshire districts, as well as TEMPro growth outside of Oxfordshire and allocations in the adopted plans which have already been built out.

4.4 Cothill Fen SAC

4.4.1 The screening assessment identified the potential for likely significant effects to areas of the SAC alongside Cothill Road associated with **ammonia in the <u>JLP Alone 2 scenario only.</u>**

Spatial extent of impact / exposure of qualifying features

4.4.2 The small area where the PC for ammonia is predicted to exceed 1% of the critical level for ammonia (Figure A1.6 in Appendix I) falls within unit 003 Cothill Fen SSSI which is designated for fen, marsh and swamp habitat._The botanical surveys identified the habitats within this area of exceedance as mixed deciduous woodland of ash, sycamore, and grey poplar with some horse chestnut, not the fen, marsh and swamp habitat which this unit is designated for and also not SAC qualifying alluvial woods habitat. On this basis, effects to the Cothill Fen SAC associated with ammonia are ruled out.

4.5 Aston Rowant SAC

4.5.1 The screening assessment identified the potential for likely significant effects to areas of qualifying habitat within the Aston Rowant SAC alongside the M40 associated with **NOx, nitrogen deposition and acid deposition in the <u>JLP 2 scenario only</u>**. For NOx and acid deposition (grassland) the PECs are predicted to be below the critical level / load; however, the air quality conservation objective at Aston Rowant SAC is to "restore" for both qualifying features (Natural England, 2019b). Therefore, on a precautionary basis these pollutants have been taken forward for Appropriate Assessment together with nitrogen deposition and acid deposition (woodland) to consider whether pollutant contributions from the Joint Local Plan may compromise the ability to deliver the "restore" objective.

Spatial extent of impact / exposure of qualifying features

4.5.2 Figure 2.8 shows the areas where the presence of the two qualifying habitats was identified during the habitat site surveys. These include *Asperulo-Fagetum* beech forests and *Juniperus communis* formations on calcareous grasslands. There were no qualifying habitats identified in the two areas of National Nature Reserve on the north side of the M40 (transect points ARA and ARE). On the opposite south side of the M40 (transect point ARB), qualifying juniper habitat was identified within some sections of the SAC. Further east qualifying beech forest habitat was identified within Grant's plantation and at Hailey wood north and south (transect points ARC and ARD respectively).

4.5.3 Figures AI.6 to AI.13 in Appendix I identify the extent of the areas within the SAC where pollutant concentrations / deposition rates are predicted to exceed 1% of the critical level / load.

4.5.4 The following paragraphs describe how far the PC's exceedance of the 1% threshold extends beyond the edge of the M40 carriageway, and hence the area of qualifying habitat exposed to this exceedance. The figures provided in the text below are summarised in Table 4.8. Table 4.5 to Table 4.7 present the transect data for each pollutant highlighting where the 1% threshold is exceeded and where qualifying habitat is present.

Nitrogen deposition

4.5.5 Rates of nitrogen deposition vary across different vegetation types. Critical loads are provided as a range because other factors influence how sensitive a habitat may be to additional nitrogen; for example, how a site is managed can affect its sensitivity to nitrogen deposition. The lower end of the range, which represents a worst case scenario, is the focus of this assessment although consideration has also been given to the upper end of the range.

4.5.6 Two separate critical load ranges have been applied in the air quality modelling for Aston Rowant. A range of 10 to 20 kgN/ha/yr has been applied for the juniper on calcareous grasslands qualifying habitat which the habitat surveys identified to be present in the south eastern portion of the SAC (see Figure 2.8). A range of 10 to 15 kgN/ha/yr has been applied for the qualifying beech forest habitat present in the east of the SAC within Grant's plantation and Hailey Wood north and south (see Figure 2.8).

4.5.7 At transect point ARB in the south east of the SAC where qualifying juniper habitats were identified, the PC is predicted to exceed 1% of the lower grassland critical load from the edge of the M40 carriageway out to around 70m. An area of approximately 0.8ha of qualifying juniper habitat within the SAC is therefore potentially impacted in this precautionary scenario. This represents approximately 1.48% of the total qualifying juniper habitat within the SAC.

4.5.8 At transects ARC and ARD in the east of the SAC where qualifying beech forest qualifying habitats were identified, the PC is predicted to exceed 1% of the lower woodland critical load from the edge of the M40 carriageway out to around 175m and 130m respectively. Including the areas at Grant's plantation, a total area of 9.46ha of qualifying beech forest habitat within the SAC is potentially impacted. This represents approximately 3.12% of the total qualifying beech forest habitat within the SAC.

Table 4.5: Aston Rowant Transect Data: Nitrogen Deposition Process Contribution JLP Alone 2

	NDep Process Contribution – JLP Alone 2 (kgN/ha/yr)		
Distance from edge of road (m)	**Transect ARB (grassland)**	**Transect ARC (woodland)**	**Transect ARD (woodland)**
2	**1.19**	**2.42**	**1.97**
3	**1.05**	**2.14**	**1.73**
5	**0.85**	**1.75**	**1.39**
9	**0.62**	**1.29**	**1.01**
17	**0.40**	**0.86**	**0.66**
33	**0.22**	**0.51**	**0.39**
65	**0.11**	**0.28**	**0.21**
129	0.05	**0.14**	**0.11**
200	0.03	0.09	0.06
Screening criterion 1% of CLo	**0.1 (lower) to 0.2 (upper)**	**0.1 (lower) to 0.15 (upper)**	

Exceedances of the 1% criterion (lower CLo) are shown in ***bold.*** *Those points falling within the SAC and where qualifying habitat is present are highlighted in yellow.*

Acid deposition

4.5.9 As for nitrogen, different acid deposition rates are also attributed to different habitat types. A critical load of 1.905 keq/ha/yr has been applied for the beech forest qualifying habitat.

4.5.10 The 1% of the woodland critical load threshold is predicted to be exceeded in a very small area of Grant's plantation and within Hailey Wood north and south (transects ARC and ARD). At transects ARC and ARD, the PC is predicted to exceed 1% of the lower woodland critical load from the edge of the M40 carriageway out to around 67m and 46m respectively. Including the areas at Grant's plantation, a total area of 2.66ha has of qualifying beech forest habitat within the SAC is potentially impacted. This represents approximately 0.87% of the total qualifying beech forest habitat within the SAC.

Table 4.6: Aston Rowant Transect Data: Acid Deposition (Woodland) Process Contribution JLP Alone 2

Distance from edge of road (m)	AcidDep Process Contribution – JLP Alone 2 (keq/ha/yr) Transect ARC (woodland)	Transect ARD (woodland)
2	**0.17**	**0.14**
3	**0.15**	**0.12**
5	**0.12**	**0.10**
9	**0.09**	**0.07**
17	**0.06**	**0.05**
33	**0.04**	**0.03**
65	**0.02**	0.01
129	0.01	0.01
200	0.01	0.00
Screening criterion 1% of CLo	**0.01905**	

Exceedances of the 1% criterion (CLo) are shown in ***bold.*** *Those points falling within the SAC and where qualifying habitat is present are highlighted in yellow.*

Nitrogen oxides

4.5.11 The critical level for NOx is 30 μgm3. The 1% threshold is predicted to be exceeded along the length of the M40 as it passes through the SAC. Based on information from transect ARB, the PC is predicted to exceed 1% of the critical level from the edge of the M40 carriageway out to around approximately 150m. An area of qualifying juniper habitat of 3.53ha could potentially be impacted. This represents approximately 6.58% of the total qualifying juniper habitat within the SAC.

4.5.12 Data from transects ARC and ARD (Hailey wood north and south) predicts the PC to exceed 1% of the critical level from the edge of the M40 carriageway out to approximately 168m on the north side of the motorway and approximately 137m on the south side. Including the areas at Grant's plantation, based on the habitat information obtained from the site surveys, approximately

10.69ha of qualifying beech forest habitat could potentially be impacted. This represents approximately 3.52% of the total qualifying beech forest habitat within the SAC.

Table 4.7: Aston Rowant Transect Data: NOx Process Contribution JLP Alone 2

	NOx Process Contribution – JLP Alone 2 (µgm3)		
Distance from edge of road (m)	**Transect ARB**	**Transect ARC**	**Transect ARD**
2	**2.42**	**2.48**	**2.27**
3	**2.28**	**2.34**	**2.13**
5	**2.08**	**2.13**	**1.92**
9	**1.78**	**1.83**	**1.63**
17	**1.39**	**1.46**	**1.27**
33	**0.97**	**1.05**	**0.91**
65	**0.59**	**0.67**	**0.58**
129	**0.34**	**0.38**	**0.33**
200	0.23	0.26	0.22
Screening criterion 1% of CLe	**0.3**		

Exceedances of the 1% criterion (lower CLe) are shown in ***bold.*** *Those points falling within the SAC and where qualifying habitat is present are highlighted in yellow.*

Table 4.8: Summary of Spatial Extent of 1% Threshold Exceedance / Exposure of Qualifying Habitats

Pollutant	**Area of qualifying habitat where 1% threshold exceeded (ha)**		**Exceedance area as proportion of total qualifying habitat within SAC (%)**	
	Juniper	**Beech**	**Juniper**	**Beech**
Nitrogen deposition	0.8	9.46	1.48	3.12
Acid deposition	-	2.66	-	0.87
Nitrogen oxides	3.53	10.69	6.58	3.52

Predicted Environmental Concentration (PEC) (total concentrations)

4.5.13 For all pollutants modelled, across all transect points adjacent to the Aston Rowant SAC, the PEC for the 'Future with JLP' scenario is predicted to be less than the PEC for the 'Future Without JLP'. That is to say, should the Joint Local Plan not be adopted, and all allocations in the adopted South & Vale and other Oxfordshire district Local Plans be built out, then the model predicts that all pollutant levels would be higher than if the Joint Local Plan were to be adopted. This change is associated with the reductions in traffic along the M40 on account of deallocation of sites at Chalgrove airfield and Nettlebed in the Joint Local Plan.

4.5.14 The PEC in the 'Future with JLP' scenario is also predicted to be less than current baseline levels (2018 and 2021) for the screened in pollutants: NOx, nitrogen deposition and acid deposition. There will not, therefore, be a net increase over time. Air quality will continue to improve over time regardless of whether the Joint Local Plan is adopted. This is associated with fleet turnover, including switching to hybrid and electric vehicles. The assessed traffic growth can be seen as retarding this improvement rather than generating a net adverse change.

4.5.15 The 'Future with JLP' PEC does not exceed the critical level for NOx. At its closest point, the SAC is directly adjacent to the M40 in Hailey wood south (transect ARD). Here total concentrations of NOx are approximately half the critical level (15.77 µgm3) – therefore there is significant headroom between the PEC and the critical levels. NOx associated with the JLP will therefore have no impact on the achievement of the "restore" target for NOx.

4.5.16 The 'Future with JLP' PEC does exceed the lower and upper critical loads for nitrogen deposition (grassland and woodland) and for acid deposition (woodland). Table 4.9 and Table 4.10 show the extent of exceedance above the critical load and where qualifying habitat is exposed to this exceedance (yellow highlights). These exceedances must be viewed in the context that the total concentrations fall below the current baseline and that the 'Future with JLP' scenario modelled includes emissions associated with adopted plan growth from Cherwell, West Oxfordshire and Oxford City, as well as TEMPro growth for outside of Oxfordshire plus allocations in the South & Vale adopted plans (and neighbouring plans) which have already been built out since the base year of 2018, and hence is considered to significantly over-predict the impact of the Joint Local Plan.

4.5.17 The M40 is also a strategic route which carries traffic across the UK. Therefore, the contribution of the Joint Local Plan towards atmospheric pollution in the locality is considered to be very minimal.

Table 4.9: Aston Rowant Transect Data: Nitrogen Deposition Predicted Environmental Concentration JLP Alone 2

	NDep Predicted Environmental Concentration – JLP Alone 2 (kgN/ha/yr)		
Distance from road centrepoint (m)	**Transect ARB (grassland)**	**Transect ARC (woodland)**	**Transect ARD (woodland)**
2	**19.14**	**35.89**	**34.49**
3	**18.47**	**34.66**	**33.34**
5	**17.53**	**32.96**	**31.75**
9	**16.44**	**30.98**	**29.97**
17	**15.42**	**29.10**	**28.34**
33	**14.61**	**27.62**	**27.15**
65	**14.11**	**26.61**	**26.34**
129	**13.88**	**25.99**	**25.88**
200	**13.81**	**25.74**	**25.71**
Critical Load	10 (lower) to 20 (upper)	10 (lower) to 15 (upper)	

Exceedances of the lower critical load are shown in ***bold.*** *Those points falling within the SAC and where qualifying habitat is present are highlighted in yellow.*

Table 4.10: Aston Rowant Transect Data: Acid Deposition (woodland) Predicted Environmental Concentration JLP Alone 2 (Transect ARB excluded as no woodland habitat present here)

	Acid Dep (woodland) Predicted Environmental Concentration – JLP Alone 2 (keq/ha/yr)	
Distance from road centrepoint (m)	**Transect ARC (woodland)**	**Transect ARD (woodland)**
2	**2.56**	**2.46**
3	**2.48**	**2.38**
5	**2.35**	**2.27**
9	**2.21**	**2.14**
17	**2.08**	**2.02**
33	**1.97**	**1.94**
65	1.90	1.88
129	1.86	1.85
200	1.84	1.84
Critical Load	1.905	

Exceedances of the critical load are shown in ***bold.*** *Those points falling within the SAC and where qualifying habitat is present are highlighted in yellow.*

Source attribution

4.5.18 Data from APIS (APIS, 2025) regarding the source attribution for background levels of nitrogen deposited onto Aston Rowant SAC show that, in 2018 across the SAC, of local sources, road emissions contributed just 11.9% of total nitrogen deposition at the SAC and that road emissions are on a declining background trend (Figure 4.3). Of the combined UK sources, road emissions contributed 10.8% and are also on a declining background trend (Figure 4.4) associated with catalytic converters reducing NOx in vehicle emissions which would then contribute to nitrogen deposition.

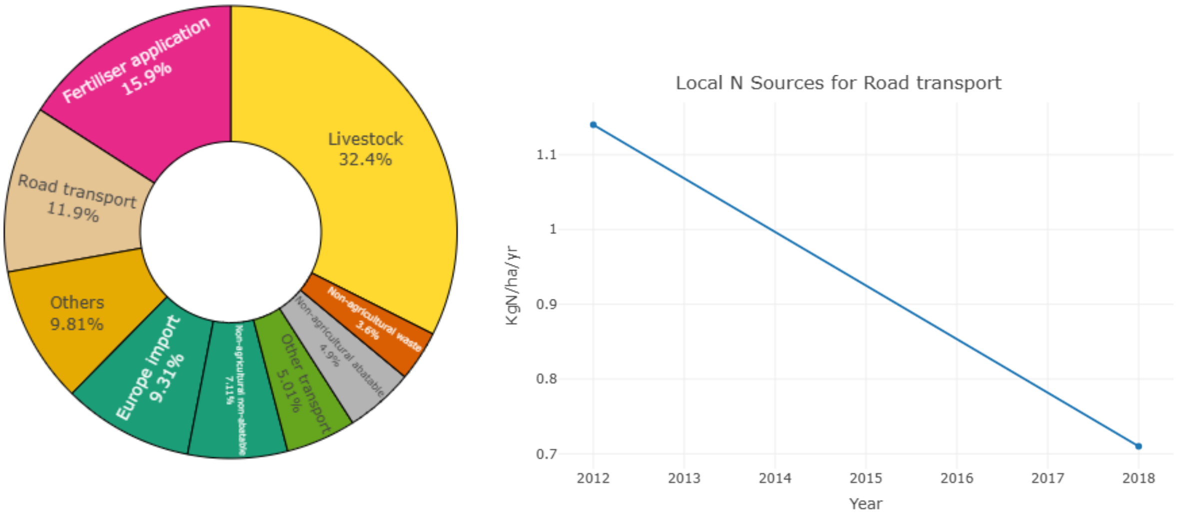

Figure 4.3: Aston Rowant SAC – Local Contributions to Nitrogen Deposition (kgN/ha/yr) from Sources (UK) and Local Source Attribution Trends 2012 to 2018 (APIS, 2025)

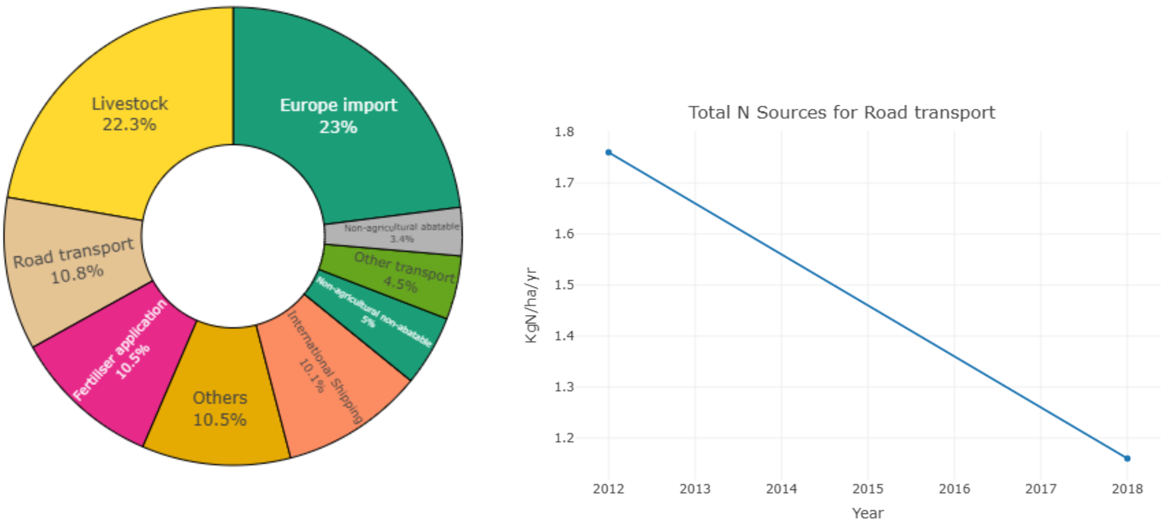

Figure 4.4: Aston Rowant SAC – Combined UK Sources Contributions to Nitrogen Deposition (kgN/ha/yr) and Total Source Attribution Trends 2012 to 2018 (APIS, 2025)

4.5.19 For acid deposition, road emissions are not itemised on the APIS pie charts (Figure 4.5), however, likely form part of the 'others' category. Trend information is not available for this category.

However, as for nitrogen deposition, catalytic converters reduce the release of sulphur dioxide which contributes to acid deposition.

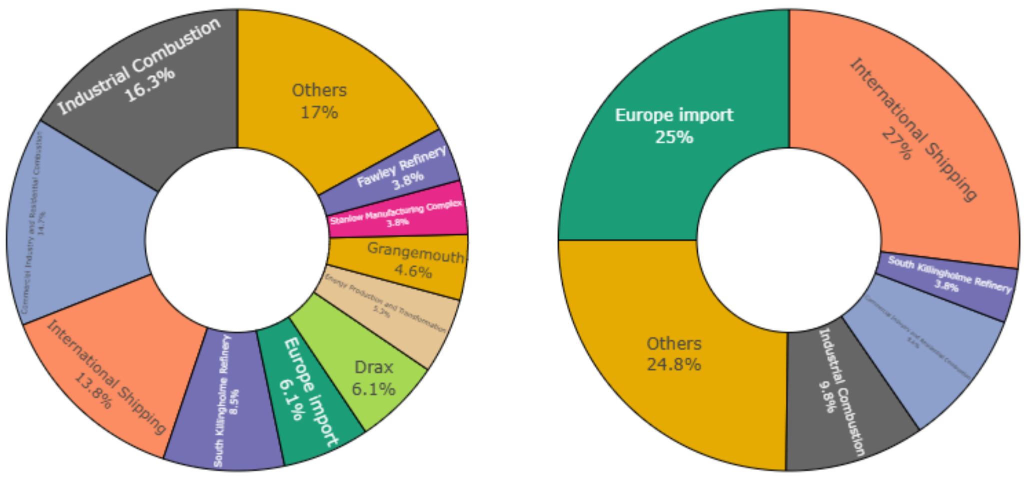

Figure 4.5: Aston Rowant SAC – Local Contributions to Sulphur Deposition (KgS/ha/yr) (L) and Sources Ranked by Total Sulphur deposition (KgS/ha/yr) from Combined UK Sources (R)

4.5.20 The implication of this source attribution information is that actions to achieve the conservation objective to restore air quality at the Aston Rowant SAC are more likely to be successful if targeted at livestock emissions and fertiliser application, rather than road transport for nitrogen deposition and at industrial emissions for acid deposition. Therefore, contributions to nitrogen deposition and acid deposition associated with the Joint Local Plan are unlikely to undermine the achievement of the conservation objective.

SAC condition

4.5.21 The latest condition assessments at the Aston Rowant SSSI were undertaken in 2022. All SSSI features, including lowland calcareous grassland and lowland beech and yew woodland, were found to be in favourable condition (Natural England, 2025), despite baseline exceedances of the critical level / load for some pollutants. Figure 3.2 in the December 2024 Appropriate Assessment report displays these condition assessments.

Topography

4.5.22 A significant stretch of the M40 running alongside the NNR and Grant's plantation is in deep cutting. Dispersion processes within cuttings can be complex. The sides of the cutting present a barrier to pollutant dispersal but, in many wind conditions, the topography may increase mixing and therefore pollutant dilution. In other wind conditions, the direction of flow may be diverted along the cutting. The dispersion model has taken account of local terrain, but not the full effects of the cutting; cuttings cannot be included explicitly within the model. When considering impacts beyond the cutting, the distance over which dispersion can occur will have been underestimated (i.e. the diagonal distance up the slope when compared with the horizontal distance over flat ground). This will most likely lead to average concentrations being marginally over-predicted beyond the cutting edge. The predictions within the cutting are therefore uncertain. While the presence of the cutting increases uncertainty in the predictions beyond the cutting edge, they are most likely to be worst case in terms of annual averages.

Appropriate Assessment

4.5.23 In light of the analysis above, the tables below provide an assessment of impacts against each of the Aston Rowant SAC conservation objectives to establish potential for adverse effects to the integrity of the site associated with NOx (Table 4.11), and nitrogen deposition and acid deposition (Table 4.12) respectively.

Table 4.11: Aston Rowant Appropriate Assessment: Effects of Nitrogen Oxides

Assessment of impacts on the Aston Rowant SAC Conservation Objectives
The extent and distribution of qualifying natural habitats The extent and distribution of the '*Asperulo-Fagetum* beech forests' and '*Juniperus communis* formations qualifying habitats' within the Aston Rowant site **will not be significantly or adversely affected** by increased levels of NOx associated with the Joint Local Plan alone or in combination.
The structure and function (including typical species) of qualifying natural habitats The structure and function of qualifying habitats within the Aston Rowant site **will not be significantly or adversely affected** by increased levels of NOx associated with the Joint Local Plan alone or in combination.
The supporting processes on which qualifying natural habitats rely An area of 3.53ha of qualifying juniper habitat is predicted to be exposed to NOx levels exceeding 1% of the critical level in the JLP Alone 2 scenario. This is estimated to represent approximately 6.58% of the total qualifying juniper habitat within the SAC. An area of 10.69ha of qualifying beech forest habitat is predicted to be exposed to NOx levels exceeding 1% of the critical level JLP Alone 2 scenario. This is estimated to represent approximately 3.52% of the total qualifying juniper habitat within the SAC. The PEC for the 'Future With JLP' does not exceed the critical level for NOx. Total concentrations of NOx are approximately half the critical level at the point where the SAC is closest to the M40,–there is significant headroom between the PEC and the critical levels. NOx associated with the JLP will therefore have no impact on the achievement of the "restore" target for NOx. On this basis, it is concluded that the supporting processes on which the qualifying habitats rely **will not be significantly or adversely affected** by increased levels of NOx associated with the Joint Local Plan alone or in combination.

Table 4.12: Aston Rowant Appropriate Assessment: Effects of Nitrogen Deposition and Acid Deposition (Woodland)

Assessment of impacts on the Aston Rowant SAC Conservation Objectives
The extent and distribution of qualifying natural habitats The extent and distribution of the '*Asperulo-Fagetum* beech forests' and '*Juniperus communis* formations qualifying habitats' within the Aston Rowant site **will not be significantly or adversely affected** by increased levels of nitrogen deposition or acid deposition to woodland associated with the Joint Local Plan alone or in combination.
The structure and function (including typical species) of qualifying natural habitats

Assessment of impacts on the Aston Rowant SAC Conservation Objectives
The structure and function of qualifying habitats within the Aston Rowant site **will not be significantly or adversely affected** by increased levels of nitrogen deposition or acid deposition to woodland associated with the Joint Local Plan alone or in combination.
<u>The supporting processes on which qualifying natural habitats rely</u> An area of 0.8ha of qualifying juniper habitat is predicted to be exposed to levels of nitrogen deposition exceeding 1% of the lower critical load in the JLP Alone 2 scenario. This is estimated to represent approximately 1.48% of the total qualifying juniper habitat within the SAC. Acid deposition effects to qualifying juniper habitats have been screened out as there is no exposure to levels exceeding the 1% threshold. An area of 9.46ha of qualifying beech forest habitat is predicted to be exposed to nitrogen deposition levels exceeding 1% of the critical level JLP Alone 2 scenario. This is estimated to represent approximately 3.12% of the total qualifying beech forest habitat within the SAC. An area of 2.66ha of qualifying beech forest habitat is predicted to be exposed to acid deposition levels exceeding 1% of the critical level JLP Alone 2 scenario. This is estimated to represent approximately 0.87% of the total qualifying beech forest habitat within the SAC. In contrast to NOx, the PEC for the 'Future with JLP' scenario does exceed the critical loads for nitrogen deposition and acid deposition (woodland). However, for both pollutants, the PEC for the 'Future with JLP' scenario is still predicted to be less than the PEC for the 'Future Without JLP' associated with the reductions in traffic along the M40 on account of deallocation of sites at Nettlebed and Chalgrove airfield in the Joint Local Plan. The PEC in the 'Future with JLP' scenario is also predicted to be less than current baseline levels. This is associated with fleet turnover, including switching to hybrid and electric vehicles. There will not, therefore, be a net increase over time. Source attribution data across the SAC also apportion only a small percentage of the background pollutant levels to road transport sources and these are on a declining trend. Therefore, contributions to nitrogen deposition and acid deposition associated with the JLP are unlikely to undermine the achievement of the restore conservation objective. It is also highly relevant that the 'Future with JLP' scenario modelled includes emissions associated with adopted plan growth from Cherwell, West Oxfordshire and Oxford City, as well as TEMPro growth for outside of Oxfordshire as well as allocations in the South & Vale adopted plans (and neighbouring plans) which have already been built out since the base year of 2018, and hence is considered to significantly over-predict the impact of the Joint Local Plan. The M40 is also a strategic route which carries traffic across the UK. Therefore, the contribution of the Joint Local Plan towards atmospheric pollution in the locality is considered to be very minimal. A significant stretch of the M40 running alongside the NNR and Grant's plantation is in deep cutting. This will most likely lead to average concentrations being marginally over-predicted beyond the cutting edge. The latest condition assessments from 2022 found the qualifying habitat features to be in favourable condition suggesting that baseline pollutant levels, which in some cases exceed critical levels / loads and which will decrease in the 'Future with JLP' scenario, are not affecting the SAC condition. In light of all these factors, the supporting processes on which qualifying habitats rely **will not be significantly or adversely affected** by increased levels of nitrogen deposition or acid deposition to woodland associated with the Joint Local Plan alone or in combination.

4.6 Aston Rowant Conclusion

4.6.1 No likely significant air pollution effects to the Aston Rowant SAC are predicted in the **JLP Alone 1 scenario** which represents the effect of adopting the Joint Local Plan (when compared with the alternative of not adopting the Joint Local Plan). This is because the Joint Local Plan itself will generate minimal additional traffic when compared with continuing with the current adopted South & Vale Local Plans (and on some important roads it will reduce traffic).

4.6.2 Likely significant effects are predicted in the **JLP Alone 2 scenario** associated with **NOx, nitrogen deposition and acid deposition**. This scenario has been modelled because Natural England has advised that it is necessary to consider the effect of the emerging Joint Local Plan together with all unbuilt allocations contained in the adopted South & Vale Local Plans. Due to traffic availability, the JLP Alone 2 scenario includes all the South & Vale emerging Joint Local Plan allocations built out, as well as adopted plan growth in other Oxfordshire districts and TEMPro outside Oxfordshire.

4.6.3 The Appropriate Assessment of effects in the 'Future with JLP' scenario concludes **no adverse effects to the integrity of the Aston Rowant SAC** for the following reasons:

- The total concentrations of pollutants modelled in the 'Future with JLP' are lower than the 'Future without JLP scenario' associated with the reductions in traffic along the M40 on account of deallocation of sites at Nettlebed and Chalgrove airfield in the Joint Local Plan;
- The total concentrations of pollutants modelled in the 'Future with JLP' are predicted to be less than current baseline levels. There will not, therefore, be a net increase over time. This is associated with fleet turnover, including switching to hybrid and electric vehicles.
- The total concentrations of NOx modelled in the 'Future with JLP' are predicted to be below the critical level and significantly below the current baseline;
- The impacts of the Joint Local Plan are significantly over-predicted in the 'Future with JLP' scenario as it also includes emissions associated with adopted plan growth in other Oxfordshire districts, as well as TEMPro growth outside of Oxfordshire and allocations in the adopted plans which have already been built out;
- The area of qualifying habitats affected as a proportion of the qualifying habitats in the whole SAC is small;
- A significant stretch of the M40 is in cutting leading the air quality model to most likely over-predict average concentrations beyond the cutting edge; and
- The SAC is currently in favourable condition despite some baseline exceedances of the environmental benchmarks (critical level /loads).

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5 Summary and Conclusions

5.1 Summary of Findings

Updated screening assessment

5.1.1 The 'JLP Alone 1' calculation predicts the change in emissions associated with the change in traffic flows in 2041 caused by replacing South and Vale adopted Local Plans with the Joint Local Plan. This change is not predicted to result in any likely significant effects at any of the three European sites.

5.1.2 The 'JLP Alone 2' calculation predicts the change in emissions associated with the change in traffic flows caused by the adopted South & Vale Local Plans together with emerging Joint Local Plan plus the adopted plans of the other Oxfordshire districts and TEMPro outside Oxfordshire. In other words, to show the impact at 2041 of implementing the emerging Joint Local Plan when compared to a future with zero growth. This calculation significantly over-predicts the impact of the Joint Local Plan but was agreed with Natural England as the best way to consider the effect of the emerging Joint Local Plan together with all unbuilt allocations contained in the adopted South & Vale Local Plans using the available traffic data.

5.1.3 At Oxford Meadows SAC, likely significant effects have been predicted for 'JLP Alone 2' associated with NOx and nitrogen deposition alongside the A34 and the A40.

5.1.4 At Cothill Fen SAC, likely significant effects have been predicted for 'JLP Alone 2' associated with ammonia along Cothill Road.

5.1.5 At Aston Rowant SAC, likely significant effects have been predicted for 'JLP Alone 2' associated with NOx, nitrogen deposition and acid deposition alongside the M40.

5.1.6 Of the Oxfordshire authorities, South & Vale and Cherwell are the only ones whose plans have currently reached Regulation 19, so it has been agreed with Natural England that just these three authorities' local plans can form part of the in-combination assessment.

5.1.7 The Cherwell emerging Local Plan forecasts a reduction in traffic flows and therefore the predicted change in emissions in the in-combination scenario is below the 'JLP Alone 2'. Therefore, no additional likely significant effects have been predicted when the Joint Local Plan is considered in combination with other plans.

5.1.8 All three SACs were taken forward for Appropriate Assessment.

Appropriate Assessment

5.1.9 No adverse effects to the integrity of the Oxford Meadows SAC have been predicted. Total concentrations of NOx are predicted to fall below the critical level. Total rates of nitrogen deposition are not predicted to exceed current baseline levels and the site is currently in favourable condition with habitat surveys not identifying any signs of nutrient enrichment.

5.1.10 No effects to the Cothill Fen SAC are predicted as there is no qualifying habitat within the areas where ammonia concentrations have been modelled to exceed the 1% threshold.

5.1.11 No adverse effects to the integrity of the Aston Rowant SAC have been predicted. Total concentrations of NOx are predicted to fall below the critical level. Total rates of nitrogen and acid deposition with the Joint Local Plan are lower than without the Joint Local Plan due to traffic reductions associated with the deallocation of sites. Total rates of deposition are not predicted to exceed current baseline levels and the area of qualifying habitat affected is small. The SAC is currently in favourable condition despite some baseline exceedances of the environmental benchmarks. The M40 is also partially in cutting and therefore the model has likely over-predicted concentrations along these stretches of the motorway.

5.1.12 In all instances, the impacts of the Joint Local Plan are considered to have been significantly over-predicted for the reasons set out in paragraph 5.1.2.

5.2 Conclusions

5.2.1 In conclusion, no likely significant effects at any of the three European sites are predicted associated with replacing South and Vale adopted Local Plans with the Joint Local Plan.

5.2.2 When considering the Joint Local Plan together with all traffic growth from adopted Plans in Oxfordshire, as well as TEMPro growth for the rest of the UK, there is potential for likely significant effects at Oxford Meadows SAC, Cothill Fen SAC and Aston Rowant SAC and therefore these sites have been taken forward for Appropriate Assessment.

5.2.3 Taking account of a variety of factors including the over-prediction of effects associated with all traffic growth, adverse effects to the integrity of all three SACs have been ruled out.

5.2.4 The Joint Local Plan is considered to be compliant with the Habitats Regulations.

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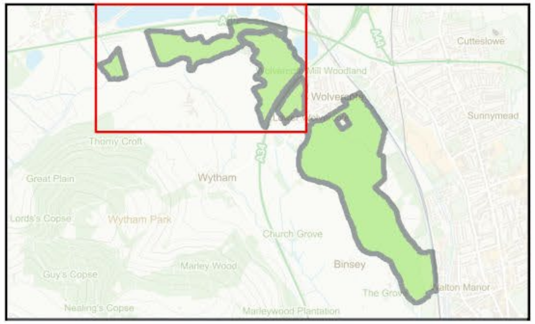
Appendix I: 1% Threshold Exceedance Contours (JLP Alone 2)

At Aston Rowant the qualifying juniper habitat is only present within the west of the SAC, and hence only the western part of the SAC is mapped for nitrogen deposition to grassland. Similarly, qualifying beech forest habitat is only present within the east of the SAC, and hence only the eastern part of the SAC is mapped for acid deposition to woodland and nitrogen deposition to woodland.

South & Vale Joint Local Plan, Air Pollution Appropriate Assessment

- Oxford Meadows SAC
- N Dep grassland (1% contour CLo 20)
- Exceedance of 1% within the SAC
- N Dep grassland (1% contour CLo 10)
- Exceedance of 1% within the SAC

Figure AI.1: Oxford Meadows A40 – Nitrogen Deposition Exceedances of the 1% Thresholds



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Date:	Jun 2025	**Reviewed by:**	NP

Drawing number:

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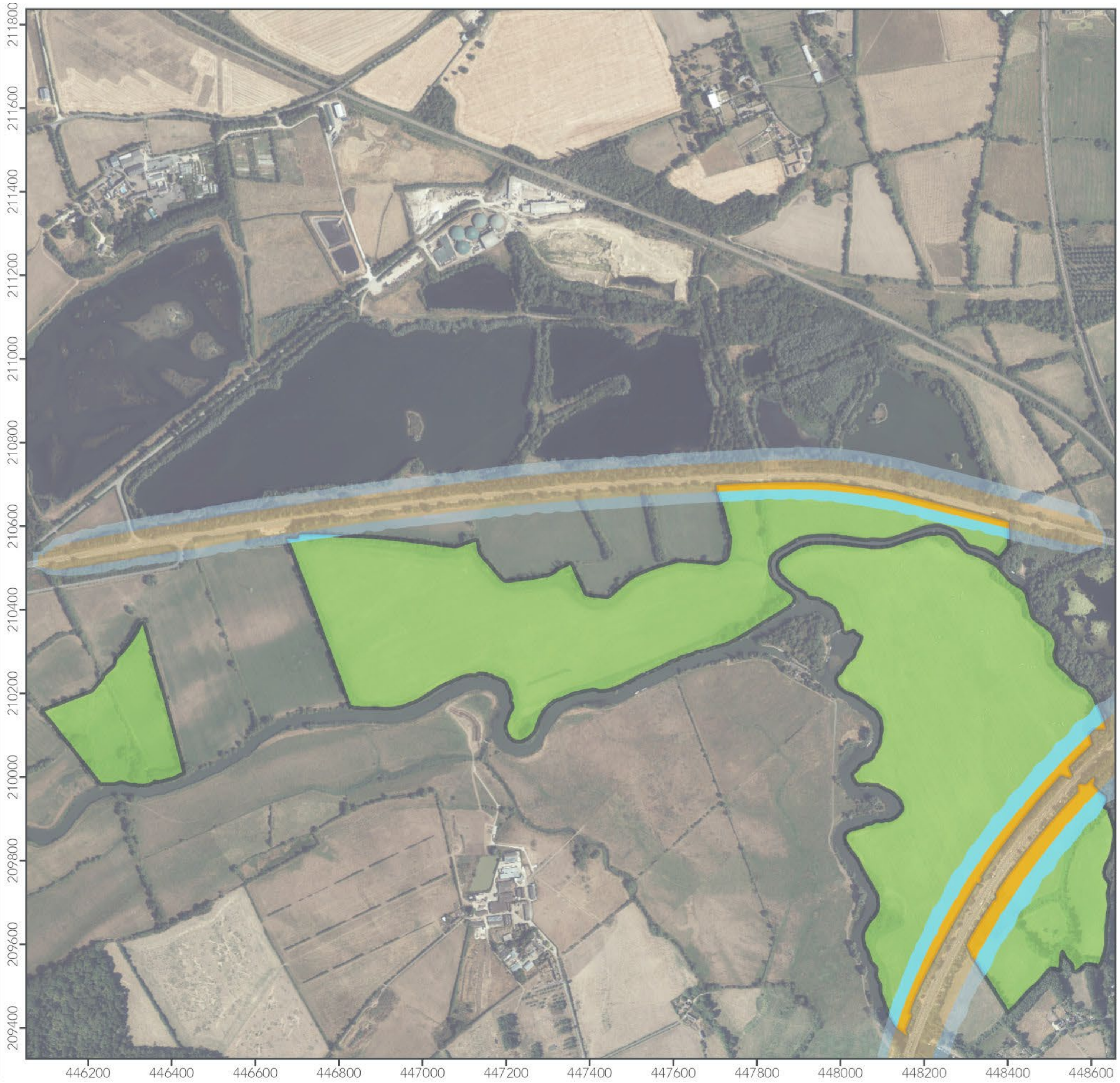
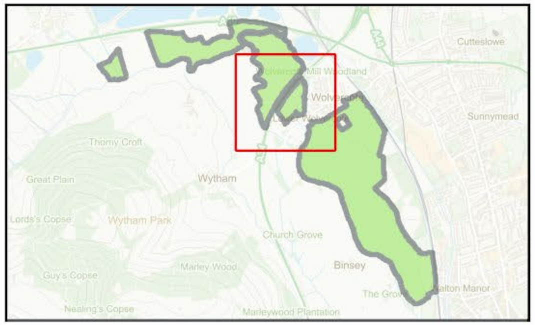


South & Vale Joint Local Plan, Air Pollution Appropriate Assessment

- Oxford Meadows SAC
- N Dep grassland (1% contour CLo 20)
- Exceedance of 1% within the SAC
- N Dep grassland (1% contour CLo 10)
- Exceedance of 1% within the SAC

Figure AI.2: Oxford Meadows A34 – Nitrogen Deposition Exceedances of the 1% Thresholds



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Oxford Meadows SAC

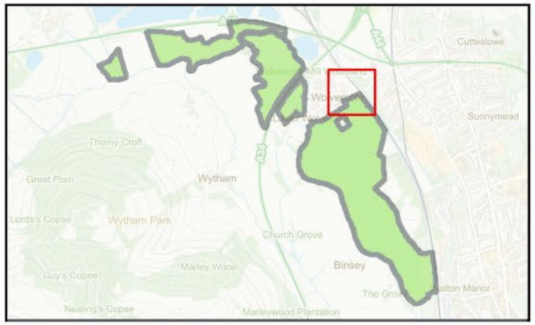
N Dep grassland (1% contour CLo 20)

Exceedance of 1% within the SAC

N Dep grassland (1% contour CLo 10)

Exceedance of 1% within the SAC

Figure AI.3: Oxford Meadows Godstow Road – Nitrogen Deposition Exceedances of the 1% Thresholds



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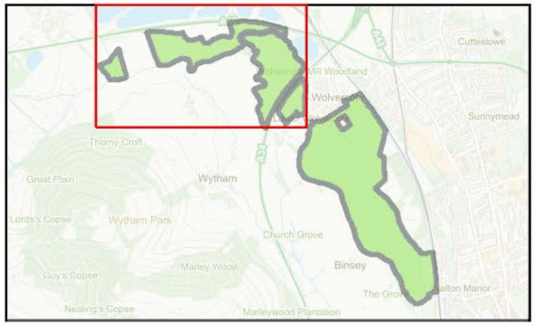
Oxford Meadows SAC

NOx (1% contour CLe 30)

Exceedance of 1% within the SAC

Figure AI.4: Oxford Meadows A40 – Nitrogen Oxides Exceedances of the 1% Threshold



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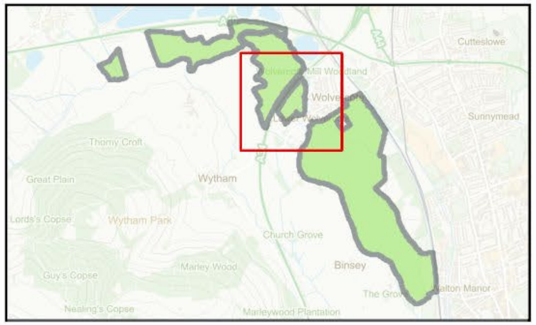
South & Vale Joint Local Plan, Air Pollution Appropriate Assessment

Oxford Meadows SAC
NOx (1% contour CLe 30)
Exceedance of 1% within the SAC

Figure AI.5: Oxford Meadows A34 – Nitrogen Oxides Exceedances of the 1% Threshold



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Cothill Fen SAC

Exceedance of 1% within the SAC

Ammonia (1% contour CLe 1)

Figure AI.6: Cothill Fen – Ammonia Exceedances of the 1% Threshold

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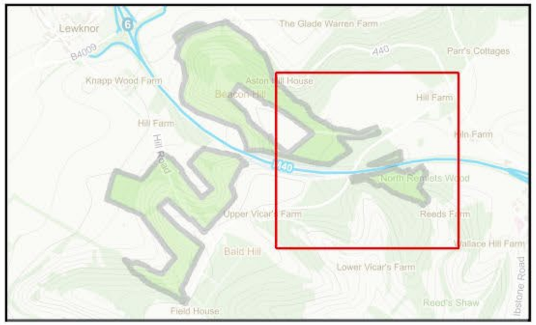
South & Vale Joint Local Plan, Air Pollution Appropriate Assessment

Aston Rowant SAC

Acid Dep woodland (1% contour CLo 1.905)

Exceedance of 1% within the SAC

Figure AI.7: Aston Rowant (East) – Acid Deposition (Woodland) Exceedances of the 1% Threshold



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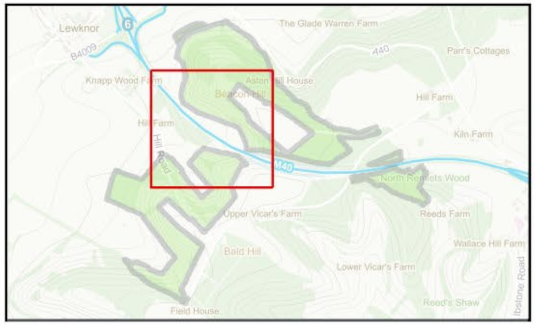
Aston Rowant SAC
N Dep grassland (1% contour CLo 20)
N Dep grassland (1% contour CLo 10)
Exceedance of 1% within the SAC
Exceedance of 1% within the SAC

Figure AI.8: Aston Rowant (West) – Nitrogen Deposition (Grassland) Exceedances of the 1% Thresholds



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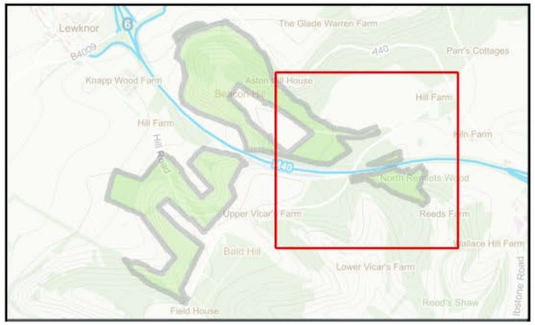
	Aston Rowant SAC
	N Dep woodland (1% contour CLo 10)
	N Dep woodland (1% contour CLo 15)
	Exceedance of 1% within the SAC
	Exceedance of 1% within the SAC

Figure AI.9: Aston Rowant (East) – Nitrogen Deposition (Woodland) Exceedances of the 1% Thresholds



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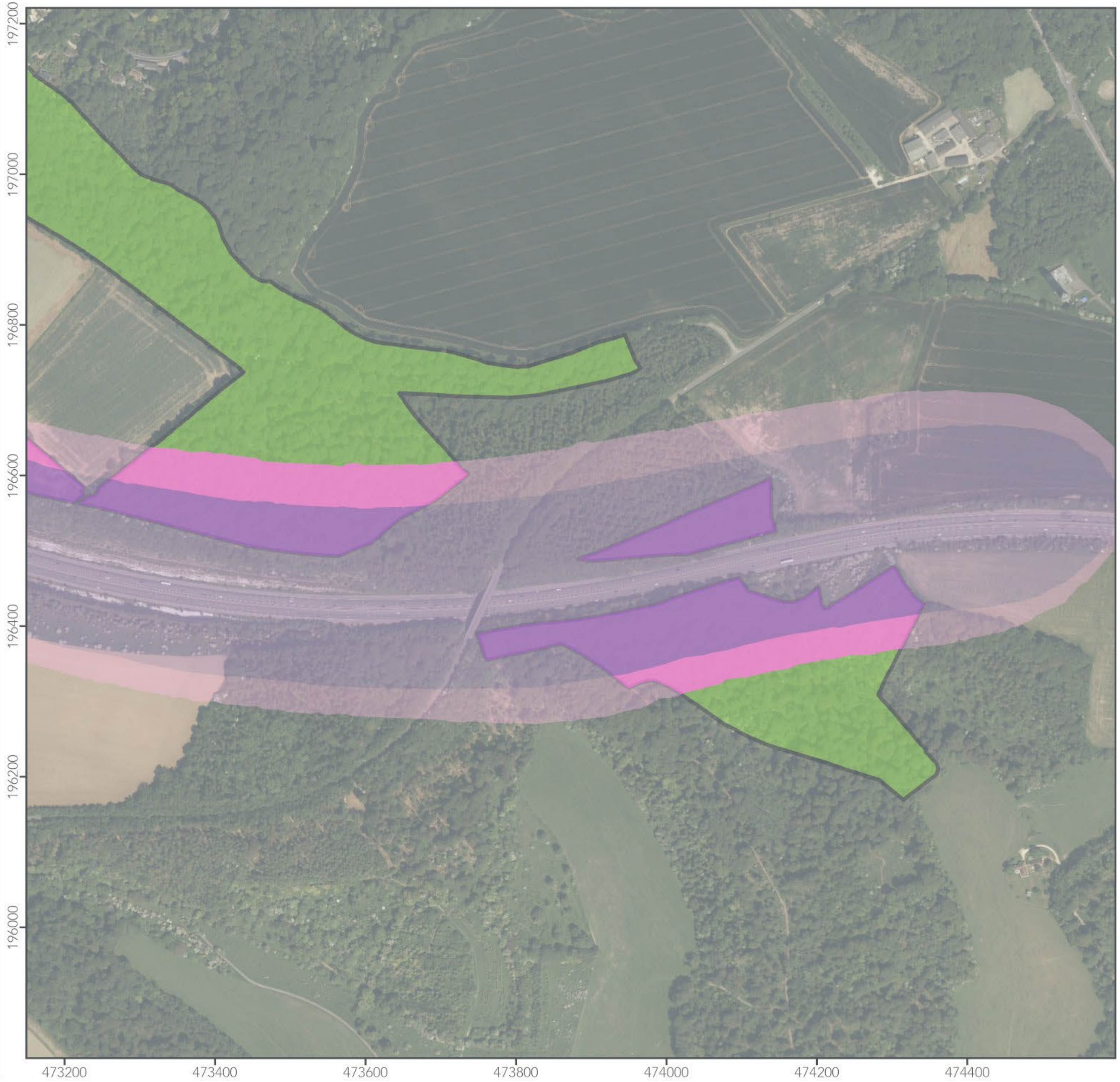


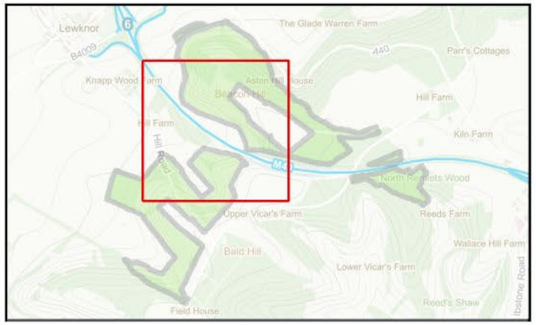
South & Vale Joint Local Plan, Air Pollution Appropriate Assessment

Aston Rowant SAC

NOx (1% contour CLo 30)

Exceedance of 1% within the SAC

Figure AI.10: Aston Rowant (West) – Nitrogen Oxides Exceedances of the 1% Threshold



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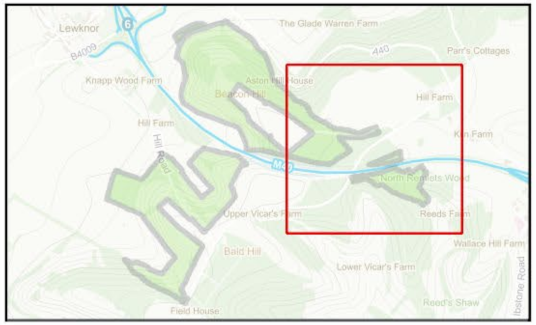
Aston Rowant SAC
NOx (1% contour CLo 30)
Exceedance of 1% within the SAC

Figure AI.11: Aston Rowant (East) – Nitrogen Oxides Exceedances of the 1% Threshold



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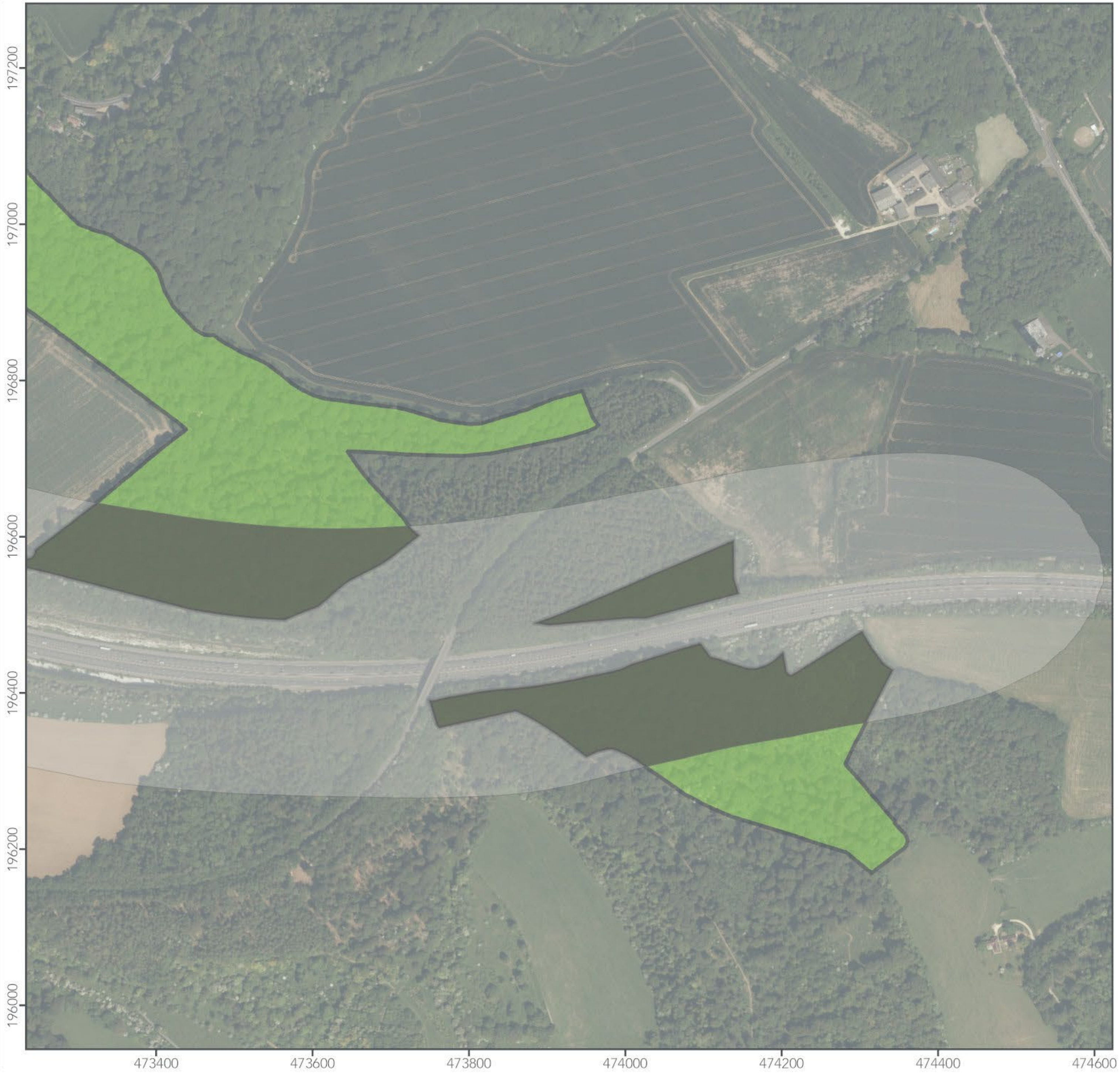

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Appendix II: Habitat Survey Findings

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Technical Note

URBAN EDGE ENVIRONMENTAL CONSULTING

Project	South Oxfordshire and Vale of White Horse Joint Local Plan – Habitats Regulations Assessment	**Date**	July 2025
Note	SAC Habitat Survey Findings	**Ref**	UE0597
Author	Richard Bickers PhD MCIEEM	**Page**	1 of 18
Status	Final		

1 Introduction

1.1 In order to inform the Appropriate Assessment of potential adverse effects to integrity, site surveys were undertaken at each of the three SACs scoped into the atmospheric pollution assessment. The surveys were undertaken over three days (6-8 May 2025) by an experienced ecologist (Richard Bickers BSc (Hons) PhD MCIEEM) with expertise in botanical survey. One day was devoted to each of the three SACs, Aston Rowant, Oxford Meadows and Cothill Fen, in that order.

1.2 The surveys were focused on areas where air quality modelling had predicted exceedances of the 1% threshold above the critical level / load (hereafter referred to simply as the 'modelled exceedance'), although areas outside these were also inspected in order to establish how well represented the qualifying features are across the SACs as a whole. The main aim of the surveys was to identify whether qualifying habitat(s), or potentially suitable habitats for qualifying species, were present in the areas of modelled exceedance. Qualifying habitats were identified with reference to the Joint Nature Conservation Committee (JNCC) habitat descriptions and to the relevant National Vegetation Communities that are referenced within them. Identification of potentially suitable habitat for creeping marshwort was based on descriptions provided within the Botanical Society of the British Isles species account.

1.3 Other relevant observations, such as the presence of species or vegetation indicative of nutrient enrichment (eutrophication), and whether this appeared to be associated with proximity to roads, were also recorded.

1.4 The surveys were undertaken within the period optimal for such surveys and weather conditions were favourable. Access was obtained to all relevant areas of the SACs. There were no significant limitations to the surveys.

1.5 This note provides a brief account of the qualifying features together with an account of the survey findings, including condition assessment. The findings should be read alongside Figures 2.4 to 2.8 in the main body of the Air Quality Appropriate Assessment Report which show the locations of features identified.

2 Qualifying Habitat Definitions

2.1 Descriptions of the qualifying species and habitats for the three SACs, based on the JNCC Annex 1 habitat descriptions[1], are provided below.

Aston Rowant SAC

2.2 ***Juniperus communis* formations on heaths or calcareous grasslands:** In southern England, including Aston Rowant, this comprises scattered or closed stands of juniper, sometimes with other scrub species, that has developed on, or is growing in, calcareous grassland. This includes National Vegetation Classification (NVC) communities CG2 *Festuca ovina - Avenula pratensis* Sheep's fescue – meadow oat grass grassland and CG3 *Bromus erectus* upright brome grassland.

2.3 ***Asperulo-Fagetum* beech forests:** This woodland, in which beech *Fagus sylvatica* is the dominant, or at least a frequent, canopy species, occurs on circumneutral to calcareous soils and largely corresponds to NVC W12 *Fagus sylvatica – Mercurialis perennis* beech – dog's mercury woodland or W14 *Fagus sylvatica – Rubus fruticosus* beech – bramble woodland. Each community has a different associated suite of species which change according to slope and soil type. As slopes become steeper, there is a shift from relatively deep, moist and moderately base-rich soils to thin, dry and strongly base-rich profiles.

Oxford Meadows SAC

2.4 **Creeping marshwort *Apium repens:*** Creeping marshwort is a creeping perennial which grows in grazed wet grassland subject to winter flooding, typically by rivers. The species became restricted to a small number of sites in Oxfordshire, principally Port Meadow, Oxford, although it has been introduced to a number of other sites in recent years.

2.5 **Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*):** This comprises species-rich hay meadows on moderately fertile soils of floodplains. Most are cut annually for hay, with aftermath grazing. Seasonal flooding maintains an input of nutrients. This habitat corresponds to NVC type MG4 *Alopecurus pratensis – Sanguisorba officinalis* meadow foxtail – great burnet grassland.

2.6 The grassland type is confined to lowland situations and is mostly associated with relatively fertile alluvial soils in floodplain situations which are subject to seasonal (ie winter) flooding. These grasslands are almost exclusively managed as traditional hay meadows with cutting taking place in early summer, followed by grazing of the re-growth or 'aftermath' in autumn or early winter. They are vulnerable to

[1] https://sac.jncc.gov.uk/habitat/

degradation through excessive nutrient input, changes in the cutting or grazing regime, and changes in hydrology[2].

Cothill Fen SAC

2.6.1 **Alkaline fens**: This consists of a complex of vegetation characteristic of sites where there is tufa and/or peat formation with a high water table and a calcareous base-rich water supply. The core vegetation is mire with low-growing sedge vegetation of the following NVC communities:

- M9 *Carex rostrata – Calliergon cuspidatum/giganteum* bottle sedge - pointed spear-moss/giant spear-moss mire
- M10 *Carex dioica – Pinguicula vulgaris* dioecious sedge - common butterwort mire
- M13 *Schoenus nigricans – Juncus subnodulosus* black bog-rush - blunt-flowered rush mire

2.6.2 At most sites there are transitions to several other fen vegetation types, including M14 *Schoenus nigricans – Narthecium ossifragum* black bog-rush – bog asphodel mire and S24 *Phragmites australis – Peucedanum palustre* common reed - milk-parsley tall-herb fen in the lowlands. Alkaline fens may also occur with various types of swamp, wet grasslands and areas rich in rush *Juncus* species, as well as fen carr.

2.6.3 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*): This comprises woods dominated by alder *Alnus glutinosa* and willow *Salix* spp. on flood plains and typically occurs on moderately base-rich, eutrophic soils subject to periodic inundation. On the drier margins of these areas other tree species, notably ash *Fraxinus excelsior* and elm *Ulmus* spp., may become abundant. This habitat falls mainly within the following NVC communities:

- W5 *Alnus glutinosa – Carex paniculata* alder - greater tussock-sedge woodland
- W6 *Alnus glutinosa – Urtica dioica* alder – common nettle woodland
- W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* alder – ash – yellow pimpernel woodland
- W2a *Salix cinerea – Betula pubescens – Phragmites australis* grey willow – downy birch – common reed woodland, Alnus glutinosa – Filipendula ulmaria alder – meadowsweet sub-community

[2] Natural England (2019a): *European Site Conservation Objectives: Supplementary advice on conserving and restoring site features Oxford Meadows Special Area of Conservation (SAC) Site Code: UK0012845 Date of Publication: 16 January 2019*. Accessed online [30/06/2025].

3 Survey Findings: Habitat Descriptions and Condition Assessment

3.1 The location of qualifying and other habitats observed during the surveys, as well as other relevant observations, in areas close to the source of pollutants is shown on Figures 2.4 to 2.8 in the main body of the Appropriate Assessment Report . Further details are provided below.

3.2 The condition of the qualifying species and habitats surveyed have been assessed with reference to relevant criteria of the JNCC Common Standards Monitoring[3] for both species and habitats, and relevant habitat indicators of pollution enrichment on the Air Pollution Information System (APIS)[4].

Aston Rowant SAC

Juniperus communis formations on heaths or calcareous grasslands

3.3 Species rich calcareous grassland was widespread within the surveyed areas of the SAC. However, juniper located within such grassland was only recorded south of the M40. Within the SAC this included a north facing bank with scattered and locally frequent mature juniper bushes c.30+m from the M40 and within the area of modelled exceedance (see Figure 2.8 in the main report). However, no younger bushes were observed.

3.4 Elsewhere in the SAC juniper was also located in calcareous grassland around the head of a coombe to the south, but outside the area of modelled exceedance.

3.5 Juniper, including younger bushes, was also frequent in areas outside the SAC, both amongst mixed scrub at the top of the M40 cutting and in part of a grassland within the National Nature Reserve, which may have been cultivated historically. The latter were, or had been, fenced, and it is possible that some or all of the juniper had been planted or its development otherwise facilitated.

3.6 Evidence of eutrophication, as expressed by vegetation composition, was limited and patchy, and there was no apparent pattern of eutrophication closer to the M40 compared to areas more distant from the road. Nettle *Urtica dioica*, was locally abundant beneath some of the juniper bushes on the bank near the M40. However, it was largely absent from the grassland matrix in which they were set and localised eutrophication may also have arisen from the use of the bushes for shade by grazing livestock.

[3] https://jncc.gov.uk/our-work/common-standards-monitoring-guidance/

[4] https://www.apis.ac.uk/search-habitat-impacts


Species rich calcareous grassland with no juniper north of M40, (not qualifying habitat, L), and juniper in calcareous grassland on slope near M40 (qualifying habitat, R)


Scattered juniper in calcareous grassland on slope near M40 (qualifying habitat)


Scattered and locally frequent juniper in calcareous grassland around coombe (qualifying habitat, L) and in exclosure (R)


Frequent juniper in probable reverting grassland, possibly from historic cultivation (L) and in exclosure (R, qualifying habitat). Outside SAC but within NNR

Asperulo-Fagetum beech forests

3.7 Most of the woodland surveyed comprised qualifying habitat, with beech abundant, sometimes dominant, or frequent in the canopy. Ash, some of it affected by ash dieback, was occasional or locally frequent in some stands.

3.8 However, some areas of more mixed and eutrophic woodland, in which beech was either absent or not more than occasional, were also present, for example near the NNR car park and further west north of the M40, and on the eastern edge of Hailey Wood/ North Remletts Wood south of the M40 (see Figure 2.8 in the main report).

3.9 Species indicative of eutrophication, such as nettle and cleavers *Galium aparine*, were patchily present in some of the woodland stands, but they did not appear to be more frequent or abundant in areas close to the M40, compared to areas further from it. Though the field layer was very variable a range of Ancient Woodland Indicators were present, and were locally frequent or abundant, right up to the SAC boundaries adjacent to the M40, and even in some places onto the cutting outside the SAC boundary. However, lower parts of the cutting and embankments, on made ground, supported locally abundant nettle.

3.10 As is typical under a beech canopy the understorey/shrub layer was patchy and often sparse or absent, as was tree regeneration. However, in addition to mature and veteran trees a range of age classes, from seedling to semi-mature trees, were scattered across most stands.

3.11 There were no signs of recent planting in any stands and non-native trees and shrubs formed only a very minor and localised component.

3.12 Veteran trees were quite frequent and large dead wood, including both standing and fallen, was moderately abundant.


Hailey Wood North – Beech woodland with mature and young trees and very little shrub or field layer (L) and field layer comprising tufted hair grass, bracken and yellow archangel (R, qualifying habitat)


Hailey Wood North outside SAC on made ground beside M40 - nettle and sycamore on M40 embankment (L), and eutrophic field layer of nettle, cleavers and bramble (R, foreground, both not qualifying habitat), with tufted hair grass, wood spurge and yellow archangel (behind, within SAC).

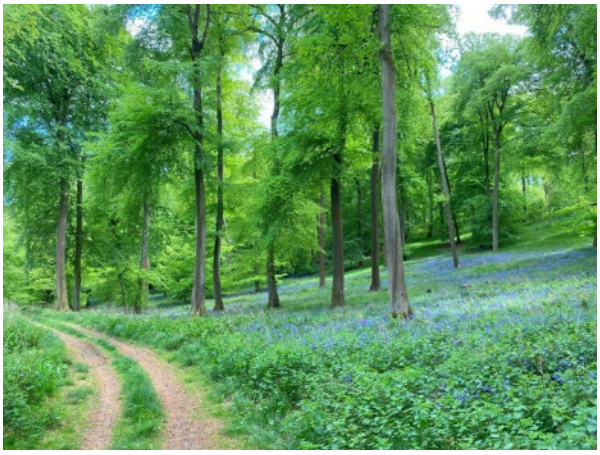

Grants Plantation – Beech and ash woodland with stands of bluebell (L) and on both sides of deer fence above M40 cutting (R, qualifying habitat)


Grants Plantation – beech seedling (L) and non-native larch and stands of nettle towards base of M40 cutting (R, not qualifying habitat), outside SAC


Near NNR car park north of M40 - Mixed ash-oak-field maple woodland with hawthorn and hazel and quite eutrophic field layer (not qualifying habitat)

Near NNR car park north of M40 - Mixed scrub and woodland with species poor field layer at top of M40 cutting (L), and beech and yew amongst mixed deciduous woodland at base of scarp (R, not qualifying habitat)

Hailey Wood South – Beech woodland in north west near M40 cutting and north of deer fence (L, qualifying habitat) and beech sapling and ash seedlings (R)



Hailey Wood South – Beech woodland with field layer of wood melick and bluebell (AWIs), north of deer fence (L) and mature beech over grassy field layer with stands of bluebell, south of deer fence (R, qualifying habitat)

North Remlets Wood – Ash-maple-hazel-hawthorn woodland with little beech and calcareous grassland in foreground (L) and mostly hazel over dog's mercury and false brome (R, not qualifying habitat)

Oxford Meadows

Creeping marshwort Apium repens

3.13 Only the northern part of Wolvercote Common, adjacent to Godstow Road was surveyed. This included a probably seasonally wet depression, some of which contained shallow standing water, as well as some bare muddy edges. As such it may offer suitable habitat for creeping marshwort. Small plants of fools watercress *Apium nodiflorum* were recorded. However, the non-native invasive New Zealand pigmyweed *Crassula helmsii* formed dense mats over parts of the feature, rendering these areas less suitable for creeping marshwort. Other parts supported a wet grassland flora. Creeping marshwort has not been recorded on Wolvercote Common in recent decades, being recorded only in the south of Port Meadow.

Wolvercote Common – Wet depression beside Godstow Road, looking east with some standing water and muddy margins. Potentially suitable habitat for qualifying species

Wolvercote Common – Dense mat of non-native invasive swamp stonecrop/New Zealand pygmyweed (L) and small plant of fool's water cress

Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)

3.14 The survey was focussed on areas adjacent to the A34 and A40, although areas away from the roads were also inspected for comparison. Most of the areas surveyed supported qualifying habitat, comprising species rich meadow with a range of characteristic species, although hedgerows and/or tree/scrub belts between meadows were not qualifying habitat. In addition, there were strips of coarser and less rich vegetation, which also do not comprise qualifying habitat, on many of the edges of the meadows, dominated by common reed *Phragmites australis* and bulky sedges *Carex* spp.. Most such strips were relatively narrow (3-10 meters) although some areas were wider, up to 45m and with scattered and locally dense willow scrub adjacent to the A34 on the northern side of Pixey Mead and up to 100m on the southern edge of Yarnton or West Mead, adjacent to the Thames. In addition, two areas of c.0.2ha at the south western end of Pixey Mead south of the A34 and in Oxey Mead comprised common reed and nettle and reed sweet-grass Glyceria maxima, canary reed-grass *Phalaris arundinacea* and nettle respectively. Whilst it is possible that eutrophication may have contributed to the loss of qualifying habitat in these areas, such loss was not disproportionately located adjacent to the roads and it is considered more likely that it is due to lack of appropriate management, especially cutting and removal of grass/hay.

Wolvercote Meadows – Species rich Lowland Hay Meadow with tall boundary hedgerows/woody vegetation (L, qualifying habitat), and abundant common reed on meadow edges where not cut

Pixey Mead south of A34 – Species rich Lowland Hay Meadow (qualifying habitat) with abundant common reed at base of embankment (where not cut, L) and area of dominant common reed with nettle (not qualifying habitat)

Pixey Mead north of A34 - Species rich Lowland Hay Meadow (L, qualifying habitat), and narrow coarser uncut strip at base of A34 embankment, with common reed and bulky sedges (R, not qualifying habitat)


Pixey Mead north of A34 – Wider area of coarser uncut vegetation with common reed and bulky sedges at base of A34 embankment (L, not qualifying habitat) and locally abundant meadow rue (R)


Oxey Mead – Species rich Lowland Hay Meadows (L, qualifying habitat), and area of coarse swamp and tall ruderal vegetation (R, not qualifying habitat)


Oxey Mead – Coarse uncut area of meadowsweet, bramble etc in north east corner of meadow (L), and swamp and tall ruderal vegetation beside river (R, both not qualifying habitat)


Yarnton/West Mead – Species rich Lowland Hay Meadow with narrow uncut strip on edge with abundant common reed on edge (L), and north western corner of meadow (R, both qualifying habitat)


Pepper saxifrage (L) and great burnet (R) approaching flowering


Early marsh orchid (L) and tubular water dropwort (R)

Cothill Fen

Alkaline fens

3.15 Alkaline fens, with characteristic communities and species, were present at both Cothill Fen National Nature Reserve/Parsonage Moor in the south and Lashford Lane Fen in the north. However, these qualifying habitats all lie outside the areas of modelled exceedance.


Parsonage Moor – Alkaline fens (qualifying habitat)


Cothill Fen NNR – Alkaline fens (qualifying habitat)


Lashford Lane Fen – Alkaline fens (qualifying habitat)


Clumps of black bog rush (L) and marsh lousewort and valerian (R)

Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)

3.16 Although qualifying habitat was observed, for example within Cothill Fen National Nature Reserve, most of the woodland close to roads (Cothill Road and Besselsleigh Road) was NVC W8 *Fraxinus excelsior - Acer campestre - Mercurialis perennis* ash – field maple – dog's mercury woodland, and therefore not qualifying habitat. In parts it contained quite a high proportion of non-native trees, including sycamore *Acer pseudoplatanus*, horse chestnut *Aesculus hippocastanum* and grey poplar *Populus × canescens* and some lay within a residential curtilage (garden). However, one area close to Cothill Road comprised open woodland or patchy trees and scrub, including willows and alder and ash, with a field layer of swamp and tall ruderal species, such as common reed, bulky sedges and nettle, a probable example of NVC W6 *Alnus glutinosa – Urtica dioica* alder – common nettle woodland. The area has therefore been identified as qualifying habitat on a precautionary basis.


Lashford Lane Fen Reserve – Mixed ash, field maple and sycamore woodland at northern edge, adjacent to Besselsleigh Road, with hazel and field layer of mostly false brome and dog's mercury (not qualifying habitat)


Mixed woodland close to Cothill Road of mostly ash, sycamore and grey poplar with hazel and hawthorn shrub layer. Field layer patchy and appears species poor with false brome, dog's mercury and ivy. Part within residential garden (not qualifying habitat)

Open or patchy 'woodland' and scrub close to Cothill Road of ash, willows and alder with open areas of common woodland, swamp and tall ruderal species (probable qualifying habitat)

Appendix III: Air Quality Modelling Technical Report (Air Quality Consultants)

Please see insert.

Report

Habitats Regulations Assessment for South and Vale Local Plan

Air Quality Modelling Technical Report

For Urban Edge Environmental Consulting Ltd

19 August 2025

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1 Introduction

1.1 This report has been prepared by Air Quality Consultants Ltd I Part of Logika Group (AQC), on behalf of Urban Edge Environmental Consulting Ltd (UEEC). It describes the air quality modelling methodology and results to inform the Habitats Regulations Assessment (HRA) of the South Oxfordshire and Vale of White Horse ('South and Vale') Joint Local Plan 2041 (JLP). The modelling predicts concentrations of nitrogen oxides (NO_x) and ammonia (NH_3), along with nitrogen and acid deposition, at those parts of the following habitats sites which have the potential to be adversely affected by emissions from road traffic. The habitats sites considered are:

- Oxford Meadows Special Area of Conservation (SAC);
- Aston Rowant SAC; and
- Cothill Fen SAC.

1.2 The locations of these sites are shown in Figure 1-1.

Figure 1-1: Designated Sites Considered in this Report

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

1.3 The modelling has been carried out following a methodology agreed with Natural England, as explained in Section 3.

1.4 This report describes the overall scope of the air quality assessment, the dispersion modelling methodology, and the modelled results. It does not interpret those results to reach a conclusion regarding Likely Significant Effects; that assessment, including the policy against which the assessment is made, is provided separately by UEEC (2025).

1.5 The professional experience of the consultants involved in preparing the assessment is summarised in Appendix A1.

2 Critical Levels and Critical Loads

2.1 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets a limit value for annual mean concentrations of NOx and for annual and winter mean concentrations of sulphur dioxide[1]. The same values have been set as domestic objectives within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002). The limit values and objectives only apply a) more than 20 km from an agglomeration (about 250,000 people), and b) more than 5 km from Part A industrial sources, motorways and built-up areas of more than 5,000 people.

2.2 Critical levels (CLes) and critical loads (CLos) are the ambient concentrations and deposition fluxes (respectively) below which significant harmful effects to sensitive ecosystems are unlikely to occur. Some of the CLes are set at the same concentrations as the objectives but do not have the same spatial constraints on where they apply. Exceedances of the CLes and CLos are considered in the context of preventing harm to sites which are protected under the various designation frameworks, including The Conservation of Habitats and Species Regulations 2017, as amended. The CLes relevant to this assessment are set out in Table 1.

2.3 The CLe for annual mean NOx concentrations is set at the same concentration irrespective of the habitats features of interest. There are two CLes for NH_3, with the lower value (1 μg/m^3) applying only where lichens or bryophytes are present or form a key part of the ecosystem integrity. This reflects the fact that lichens and bryophytes are not connected directly to soil nutrients and can therefore be particularly susceptible to changes in atmospheric nitrogen. UEEC has carried out detailed habitats surveys of the areas which could potentially be affected by changes to traffic emissions and, on the basis of these surveys, UEEC has advised which NH_3 CLe applies in which location. A short-term (24-hour mean) CLe for NOx has also been set, but is not relevant to the current assessment, which is concerned with annual average effects from increased road traffic (Holman et al, 2020).

Table 1: Vegetation and Ecosystem CLes [a]

Pollutant	Time Period	CLe
NOx (expressed as NO_2)	Annual Mean [a,b]	30 μg/m^3
NH_3	Annual Mean	3 (1[c]) μg/m^3

[a] The CLes are defined by the World Health Organisation (WHO, 2000).

[b] Away from major sources (see Paragraph 2.1), this CLe is set as an objective (Defra, 2007) and a limit value (The European Parliament and the Council of the European Union, 2008).

[c] The more stringent CLe of 1 μg/m^3 only applies where lichens or bryophytes are present or form a key part of the ecosystem integrity. Following a review of APIS and discussions with UEEC, a CLe of 3 μγ/m^3 has been applied to Oxford Meadows and the roadside areas of Aston Rowant, and a value of 1 μg/m^3 has been applied to Cothill Fen.

2.4 The CLos are specific to different habitat types. The Air Pollution Information System (APIS, 2025) sets out the CLos which might apply across the entirety of each habitats site. This information has been used, alongside discussions with UEEC following their detailed local habitats surveys, to define which CLos are relevant to the locations of interest to this study.

[1] Sulphur dioxide is no longer emitted in significant quantities from road transport and does not, therefore, require assessing here.

2.5 The CLos for nitrogen deposition are published as ranges. This is because other factors influence how sensitive a habitat may be to additional nitrogen; for example how a site is managed can affect its sensitivity to nitrogen deposition. To provide a worst-case assessment, this report has primarily focussed on the lower-bound of each CLo range. However, consideration has also been given to the upper-bound to provide additional information.

2.6 Acid deposition is assessed against the "CLmaxN" value published on APIS (2025). This is the level above which additional deposition will cause acidification.

2.7 The CLos used in this assessment are provided in Table 2.

Table 2: Vegetation and Ecosystem CLos

Site	Nutrient Nitrogen (kgN/ha/yr)	Acid Deposition 'N_{max}' (keq/ha/yr)
Oxford Meadows	10-20	4.856
Aston Rowant – short semi-natural vegetation	10-20	4.856
Aston Rowant – woodland	10-15	1.905
Cothill Fen – short semi-natural vegetation	15-25	4.856

3 Assessment Approach

3.1 The assessment has been carried out following current best practice, drawing on the professional expertise of the consultants involved (Appendix A1). Care has also been taken to ensure consistency with the assessment of air quality impacts on human health from the South Oxfordshire and Vale of White Horse Joint Local Plan (Ricardo, 2024), guidance issued by the Institute of Air Quality Management (Holman et al, 2020) and by the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2021). It also follows an approach which has been agreed in detail with Natural England, as explained below.

Consultation

3.2 A meeting was held on 26/02/25 involving staff from South Oxfordshire District Council, Vale of White Horse District Council, Oxford City Council, Cherwell District Council, UEEC, AQC, and Natural England. During this meeting, the approach to the air quality modelling was discussed at length. This included the:

- source of traffic data for the assessment;
- definition of the base year for the assessment;
- future scenarios to be used to quantify the changes both alone and in-combination with other relevant plans;
- source of baseline air quality data for the assessment, including the combination of data from different baseline years;
- approach to forecasting future background concentrations and deposition fluxes;
- approach to predicting traffic emissions; and
- approach to dispersion modelling.

3.3 A technical note was provided to Natural England prior to this meeting (South and Vale District Councils, 2025a). Following the meeting, a non-technical note was provided, which summarised the key points of the agreed methodology (South and Value District Councils, 2025b).

3.4 Natural England confirmed its agreement with the non-technical note by email on 07/04/25.

Monitoring Data

3.5 Information on existing nitrogen dioxide concentrations has been obtained by collating the results of monitoring carried out by South and Vale Councils, and National Highways. This has focused on roadside monitoring which is carried out to assess impacts on human health. The measurements have been used here to verify the air quality model as described in Appendix A2. Information on existing background NH_3 concentrations has been obtained by collating results of monitoring carried out on behalf of Defra as part of the National Ammonia Monitoring Network (NAMN). This consists of 95 sites across the UK, one of which is close to the study area. This is a rural background monitor and the measurements have been used here to verify the background data used in this assessment as described in Appendix A2.

Assessment Scenarios

Traffic Data

3.6 The air quality predictions need to demonstrate:

- the total concentrations and deposition, both now and in the future;
- the changes to concentrations and deposition caused by the JLP, both alone and in-combination with other relevant plans and projects; and
- the change to concentrations and deposition between now and the future.

3.7 The JLP itself will generate minimal additional traffic (and on some important roads it will reduce traffic when compared with continuing with the current adopted Plans). However, for the assessment of the JLP 'alone', Natural England has advised that it is necessary to consider the effect of the emerging JLP together with all unbuilt allocations contained in the adopted South Oxfordshire and Vale of White Horse Plans. Thus, while most air quality assessments consider the effect of a plan or project 'alone' as being the change that would be caused by adoption of that plan or project, Natural England's advice here is that the assessment 'alone' should combine the change that would be caused by adoption of the JLP, with the residual effect of the adopted Plans.

3.8 The air quality modelling is based on traffic data predicted using the Oxfordshire Strategic Model. This is available for three scenarios:

- **Traffic 1:** 2018 base year;
- **Traffic 2:** 2041 with all the South and Vale adopted plan allocations built out, as well as adopted plan growth in other Oxfordshire districts and TEMPro[2] outside Oxfordshire; and
- **Traffic 3:** 2041 with all the South and Vale emerging JLP allocations built out, as well as adopted plan growth in other Oxfordshire districts and TEMPro outside Oxfordshire.

3.9 There are two key points about the traffic data which are important in understanding the framing of the air quality modelling:

- The modelled scenarios mean that it is not possible to separate out traffic associated with those site allocations built out to date, from traffic associated with those which still remain to be constructed; and
- Traffic associated with South and Vale adopted plan growth cannot be separated out from traffic associated with adopted plan growth in other Oxfordshire districts (Cherwell, Oxford City and West Oxfordshire).

3.10 It has therefore been necessary to use these available traffic data to assess the effect of the JLP alone. The difference between Traffic 2 and Traffic 3 is the change that would be caused by adopting the JLP. This has been termed 'Alone 1'. Following discussion with Natural England, the increase in flows between Traffic 1 and Traffic 3 has been termed 'Alone 2'. This represents the entire forecast growth in traffic between 2018 and 2041, only some of which will be caused by unbuilt allocations in the existing Plans or by the JLP. 'Alone 2' therefore provides for a highly precautionary assessment, particularly on strategic routes which carry traffic from across the UK.

[2] Trip End Model Presentation Program. This software is developed by the UK Department for Transport and uses data from the National Trip End Model.

3.11 Although 'Alone 2' includes traffic generated by sources other than the JLP, Natural England advised that a separate assessment 'in-combination' is also required. This is because, while Traffic 3 includes adopted plan growth in other Oxfordshire districts, it does not include growth from other emerging plans. Of the Oxfordshire authorities, South and Vale, and Cherwell are the only ones whose plans have currently reached Regulation 19 stage, so in discussion with Natural England, it was agreed that just these three authorities' local plans can form the in-combination assessment. An additional traffic dataset has therefore been generated:

- Traffic 4: 2041 with all the South and Vale emerging JLP allocations built out, as well as adopted plan growth in other Oxfordshire districts, TEMPro outside Oxfordshire, and Cherwell emerging plan growth. This has not been simulated by running the Oxfordshire Strategic Model. Instead, the change to traffic predicted as part of the evidence supporting the emerging Cherwell Plan has been added to the Traffic 3 scenario. While this is a simplistic approach, since it does not consider vehicle re-routing, the very small increments of change associated with the emerging Cherwell Plan mean that the approach is appropriate.

3.12 Traffic 4 has been used to create two in-combination scenarios. 'In-combination 1' is the difference between Traffic 2 and Traffic 4. This is the straightforward combined effect of adopting both emerging plans (Cherwell's Plan and the JLP). 'In-combination 2' is the difference between Traffic 1 and Traffic 4 and contains all forecast growth between 2018 and 2041, including both emerging plans.

3.13 It should, however, be noted that the only roads alongside habitats sites which are predicted to be affected by both the JLP and the emerging Cherwell Local Plan are the A40[3] and A34, and that the emerging Cherwell Plan is predicted to reduce traffic volumes on both of these roads. Therefore, the in-combination assessments considered in this report are unusual in that they result in a smaller increase in traffic than the JLP alone.

3.14 The approach to this assessment is unusual but necessitated by the available traffic data and Natural England's request to include unbuilt allocations from the adopted Plan growth within the 'alone' assessment. The 'in-combination 2' scenario includes all traffic growth which would usually be contained within an in-combination assessment and is therefore both typical and robust. Similarly, the 'Alone 1' scenario provides a straightforward assessment of the impact of adopting the JLP. The 'Alone 2' scenario will overstate the effect of the JLP and is therefore precautionary.

Air Quality Base Year

3.15 Total concentrations and deposition are assumed to be the sum of the influence of local traffic and the 'background' (which represents the influence of all other emissions sources, ranging from local to international and is taken from published data). Traffic volumes, emissions per vehicle, and background conditions, all change year to year.

3.16 As explained in Paragraph 3.8, the traffic model has been run for a base year of 2018. This is the year for which the traffic model has been verified and is also the base year for the air quality assessment of human health effects of the JLP (Ricardo, 2024). Natural England requested that the base year for this current assessment is 2021, which aligns with the most recent available predicted background concentrations and fluxes which it expects to be used in assessments (see Paragraph 3.25, below).

3.17 Traffic volumes, and roadside concentrations of traffic-related air pollutants, were depressed in 2021 by the COVID-19 Pandemic (Figure 3-1). It would be inappropriate to base forecasts of future traffic volumes on a traffic model with unusually low traffic volumes, which would be the case if 2021 traffic flows were used. This is less of a concern for the background concentrations and deposition, which

[3] For the purpose of this in-combination assessment, the change in traffic on the A40 caused by the emerging Cherwell Local Plan has been assumed to continue along the M40.

are largely based on modelled forecasts which did not anticipate the COVID-19 pandemic and are, in any event, dominated by sources other than road traffic (e.g. emissions from agriculture in mainland Europe).

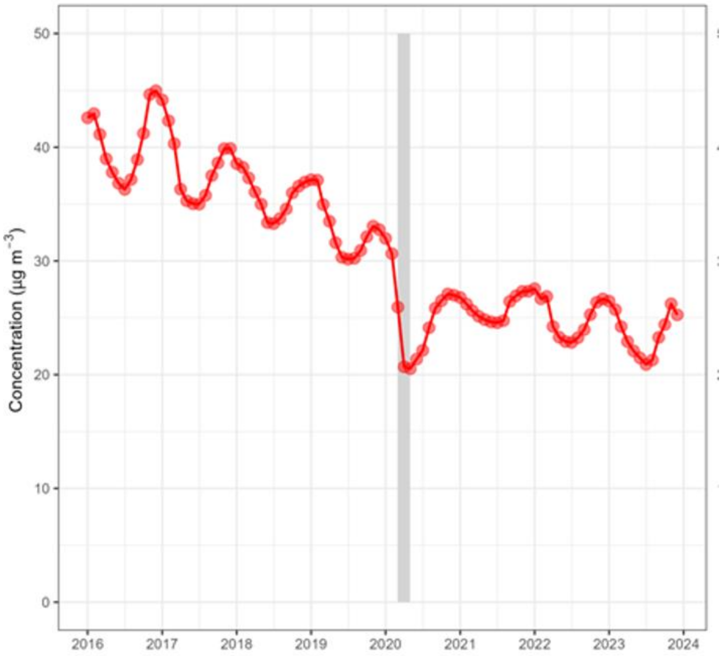

Figure 3-1: Mean monthly 'deweathered' roadside nitrogen dioxide concentrations from 2016 to 2024 at 175 monitoring sites with sufficient data capture across the UK[4].

3.18 In order to most robustly use the available air quality and traffic data, several different baseline scenarios have been modelled, each with a different purpose. These are summarised in Table 3. Several of these relate to verifying the air quality model, which is described in detail in Appendix A2. Predicted concentrations and deposition fluxes within the SAC have been produced for both 2018 and 2021.

[4] The vertical grey bar shows the first COVID-19 lockdown. Generated following the methodology described by AQC (2022).

Table 3: Summary of Base Year Air Quality Model Runs

Traffic Flows	Emissions per Vehicle[a]	Background [b]	Purpose
2018 (Traffic 1)	2018	2018	Calibrate the model against air quality measurements made in the same year in which the traffic model was validated.
2018 (Traffic 1)	2018	2021	Predicted concentrations and deposition within the SAC – labelled '2018'. This represents the most 'pure' use of the available baseline traffic data but misaligns the 2018 traffic emissions with the 2021 background data.
2018 (Traffic 1)	2021	2021	Compare the calibrated model against air quality measurements made in Natural England's requested base year (expecting some model over-read owing to using pre-pandemic flows to represent conditions during the pandemic). This is solely provided as a comparison; the results have not been used to further adjust the model. Predicted concentrations and deposition within the SAC – labelled '2021'. This represents the closest possible approach to predicting conditions in 2021, although it is reasonable to expect that the true conditions during 2021 were temporarily lower than this owing to the COVID-19 Pandemic.
2018 (Traffic 1)	2023	2023	Compare the calibrated model against the most recent year of available quality assured air quality measurements (expecting some model under-read owing to not including any traffic growth between 2018 and 2023). This is solely provided as a comparison; the results have not been used to further adjust the model.

[a] Emissions of NOx and NH_3 per vehicle were calculated as explained in in Appendix A2.

[b] Background concentrations and fluxes were generated as explained in Paragraph 0.

Future-year Air Quality Scenarios

3.19 In addition to the current baseline scenarios, air quality modelling has been used to predict conditions in 2041. The 2041 scenarios (Traffic 2, Traffic 3, and Traffic 4) have all been modelled combining 2041 traffic volumes with 2041 emissions per vehicle, and a worst-case approach to forecasting 2041 background concentrations and fluxes. A further scenario has also been modelled which is termed 'future zero growth'. This combines 'Traffic 1' (2018 flows) with 2041 emissions per vehicle and background data. This is necessary in order to construct the 'Alone 2' and 'in-combination 2' scenarios, since a direct comparison of 2018 or 2021 conditions with those in 2041 with the JLP would be confounded by changes to emissions per vehicle over that period.

3.20 To illustrate the difference that year-specific emissions per vehicle make, Figure 3-2 shows the predicted reductions in traffic emissions around Oxford Meadows assuming no change over time in total traffic volumes. This reflects fleet turnover, including switching to hybrid and electric vehicles. The reductions to NH_3 emissions are smaller than those for NOx mainly because the European type approval emissions standards are primarily targeted at reducing emissions of NOx, and NH_3 emissions are a biproduct of controlling emissions of NOx.

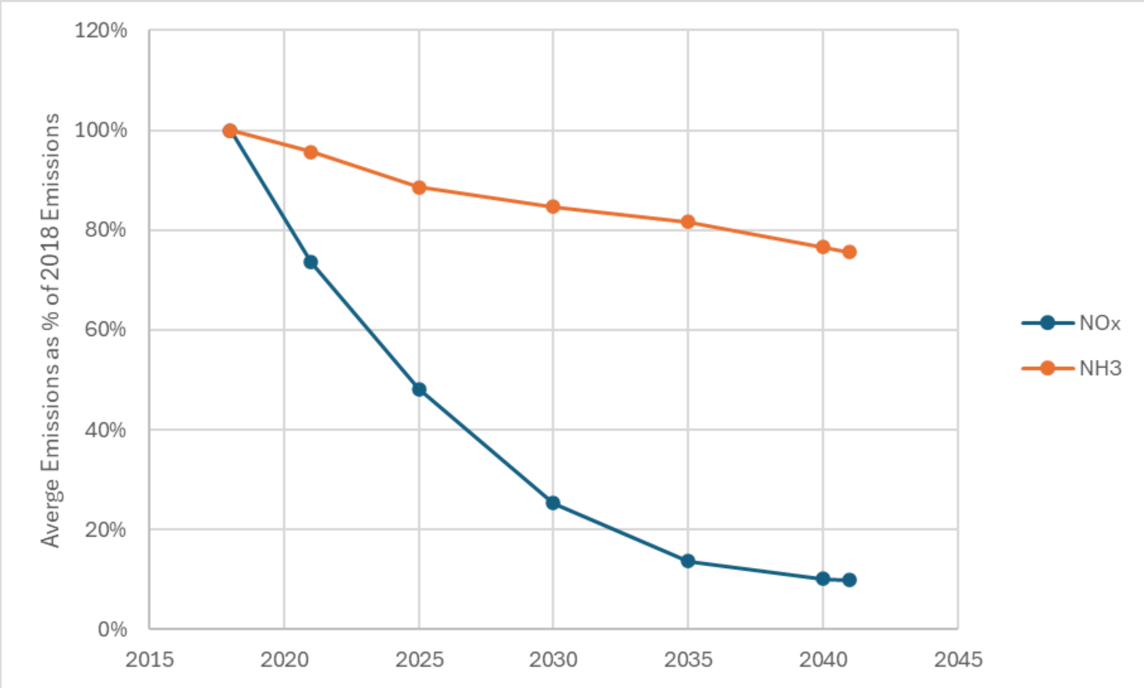

Figure 3-2: Average Emissions, Expressed as a Percentage of those in 2018, from All Roads Around Oxford Meadows SAC, based on 2018 Traffic Volumes, but Selecting Various Different Emissions Years.

3.21 Emissions of NH_3 have been predicted using AQC's CREAM V2A model (AQC, 2025), which is able to robustly predict emissions in all relevant years. Emissions of NOx have been predicted using Defra's EFT (V13) (Defra, 2025), which contains the following caveat:

"Supporting LAQM tools (e.g. Background Mapping Data, NO_2 Adjustment for NOx Sector Removal Tool, and the NOx to NO_2 Calculator) currently only support assessment years 2021-2040 inclusive. Therefore, where EFT calculated emissions are to be used after 2040 to inform air quality assessments, the appropriate caveats around the limitations of the analysis must be included to accompany the assessment."

3.22 The sector removal tool has not been used in the current assessment but the background maps and NOx to NO_2 [5]calculator have, with these set to 2040[6]. As shown in Figure 3-2 predicted NOx emissions per vehicle in 2040 and 2041 are sufficiently similar that this will not have any significant bearing on the model results.

3.23 The modelling methodology agreed with Natural England stated that emissions for 2040 would be used to represent 2041. In practice, emissions for 2041 were used. As shown in Figure 3-2, the difference between these two years is too small to have any material effect on the results of this study, and the 2041 data are considered most appropriate to use.

[5] NO_2 is nitrogen dioxide. NOx is the sum of NO and NO_2. NO rapidly forms NO_2 in the air and so it is necessary to predict the relationship between NOx and NO_2.
[6] it is reasonable to expect background NOx and NO_2 concentrations in 2041 to be lower than those in 2040, all other things being equal. Therefore the 2040 backgrounds can be taken as a worst-case approach to predicting 2041.

Summary of Air Quality Modelling Scenarios

3.24 Disregarding those scenarios used only to calibrate and test the performance of the air quality model, Table 4 details all of the scenarios use to predict total concentrations and deposition to the SACs. The total concentration or deposition is often called the 'Predicted Environmental Concentration' (PEC).

The impacts of the JLP, alone and in-combination, have been calculated by comparing the results for the scenarios in Table 4 against one another. How this has been done is summarised in Table 5. The change to concentrations and deposition is often called the 'Process Contribution' (PC).

Table 4: Summary of Air Quality Model Runs used to Predict Total Concentrations and Deposition (PECs)

Name	Traffic	Emissions per Vehicle	Background
2018	Traffic 1	2018	2021
2021	Traffic 1	2021	2021
Future Zero Growth	Traffic 1	2041	2041[a]
Future Without JLP	Traffic 2	2041	2041[a]
Future With JLP	Traffic 3	2041	2041[a]
Future In Combination	Traffic 4	2041	2041[a]

[a] As explained in Paragraph 3.26, while the backgrounds are conceptually those for 2041, they are worst-case and were derived using both 2040 and 2030 data.

Table 5: Summary of Predicted Changes to Concentrations and Deposition (PCs)

Name	Construction
PC – JLP Alone 1	Future With JLP minus Future Without JLP
PC – JLP Alone 2	Future With JLP minus Future Zero Growth
PC – In Combination 1	Future In Combination minus Future Without JLP
PC – In Combination 2	Future In Combination minus Future Zero Growth

Background Concentrations and Fluxes

3.25 Background concentrations of NOx and NH_3, and nitrogen and acid nitrogen deposition fluxes, have been taken from APIS (2025). The concentrations and deposition fluxes represent 1 km x 1 km averages. APIS currently presents 3-year mean values centred on the calendar year of 2021 and these have been taken to represent conditions in 2021. Appendix A2 provides a comparison of these predictions against local measurements.

3.26 Concentrations of NH_3 and deposition fluxes have been adjusted to represent the future using the rate of change predicted for this area using the Business-as-Usual assumptions of the Joint Nature

Conservation Committees (JNCC's) Nitrogen Futures project (JNCC, 2020)[7]. Nitrogen Futures only predicted changes to 2030, so following discussion with Natural England, the rate of change predicted by JNCC between 2021 and 2030 has been used to predict concentrations and deposition in 2041 (i.e. only 9 years' of change have been accounted for). Given the UK's national and international commitments to reduce emissions, as well as evidence from monitoring across the UK showing significant recent improvements in background concentrations of both NOx and NH_3, this approach is most likely to over-predict in 2041 and therefore provide a conservative assessment. Concentrations of NOx in 2041 have been predicted by multiplying the 2021 concentration taken from APIS by the relative change to concentrations (between 2021 and 2040) for each location predicted in Defra's latest (2021-based) national NOx maps published for Local Air Quality Management (Defra, 2025). Background concentrations of nitrogen dioxide (NO_2) are only needed to inform the conversion of NOx to NO_2. These have been taken directly from Defra's maps for each relevant year (using 2040 to represent 2041).

Modelling Methodology

3.27 Concentrations have been predicted using the ADMS-Roads dispersion model v5. This is a new generation model that incorporates a state-of-the-art understanding of the dispersion processes within the atmospheric boundary layer. The model has been run taking account of spatially-variable terrain and surface roughness. It has been run using a full calendar year (2018, to match the model verification) of hourly-sequential meteorological data measured at RAF Benson. All roads that are within 200 m of one of the SACs and are included in the traffic model have been incorporated in the air quality model. Further details of the model configuration and meteorological data are given in Appendix A2.

3.28 As noted previously, emissions of NOx, input to the ADMS-Roads dispersion model, were derived using Defra's latest Emissions Factor Toolkit (EFT) (v13.1) (Defra, 2025). Emissions of NH_3 were derived using AQC's Calculator for Road Emissions of Ammonia (CREAM) (v2A) model (AQC, 2025). Both models take account of forecast changes to the vehicle fleet composition over time and so allow year-specific predictions of emissions per vehicle. These are based on national-level forecasts published by Defra and the DfT.

3.29 The Existing Transport Conditions Report prepared for the JLP (South Oxfordshire and Vale of White Horse District Councils, 2024b) details the rapid electric vehicle uptake across Oxfordshire, as well as the expansion in EV charging infrastructure. It is not, however, possible to directly translate vehicle sales to fleet composition data, since the latter take account of the distance travelled by different vehicle types (e.g. newer vehicles are typically used more than older vehicles). Defra and DfT publish detailed fleet composition forecasts and, notwithstanding recent local sales data, these nationally-produced forecasts provide the most robust approach to predicting future EV use. Notwithstanding this, based on recent local EV sales data, the nationally-derived forecast are most likely to over-predict traffic emissions of NOx and NH_3 in the future in this study area, making the air quality modelling robust.

3.30 Details of the model inputs and the model verification are provided in Appendix A2. Deposition fluxes have been calculated from the predicted concentrations of nitrogen dioxide and NH_3. Details on the method for calculating the deposition are also provided in Appendix A2.

[7] A linear rate of change has been assumed between 2017 and the 2030 Business as Usual scenario, with the APIS 2021 data scaled based on the location-specific predicted changes. Acid nitrogen deposition has been calculated from the predicted nitrogen deposition.

Receptors

3.31 Impacts have been predicted at a series of transects alongside each affected road within 200 m of an SAC. The locations of these transects are shown in Figure 3-3 to Figure 3-5. Within each transect, receptors have been placed at the following distances from the roads: 2 m, 3 m, 5 m, 9 m, 17 m, 33 m, 65 m, 129 m and 200 m [8]. In addition, a total of 88,000 receptors have been placed at various points in and around each SAC, using source-oriented grids at the same distances as the transects, and underlying Cartesian grids with spacing ranging from 18 m to 50 m and covering the full extent of each SAC. These additional receptors have been used to generate isopleths.

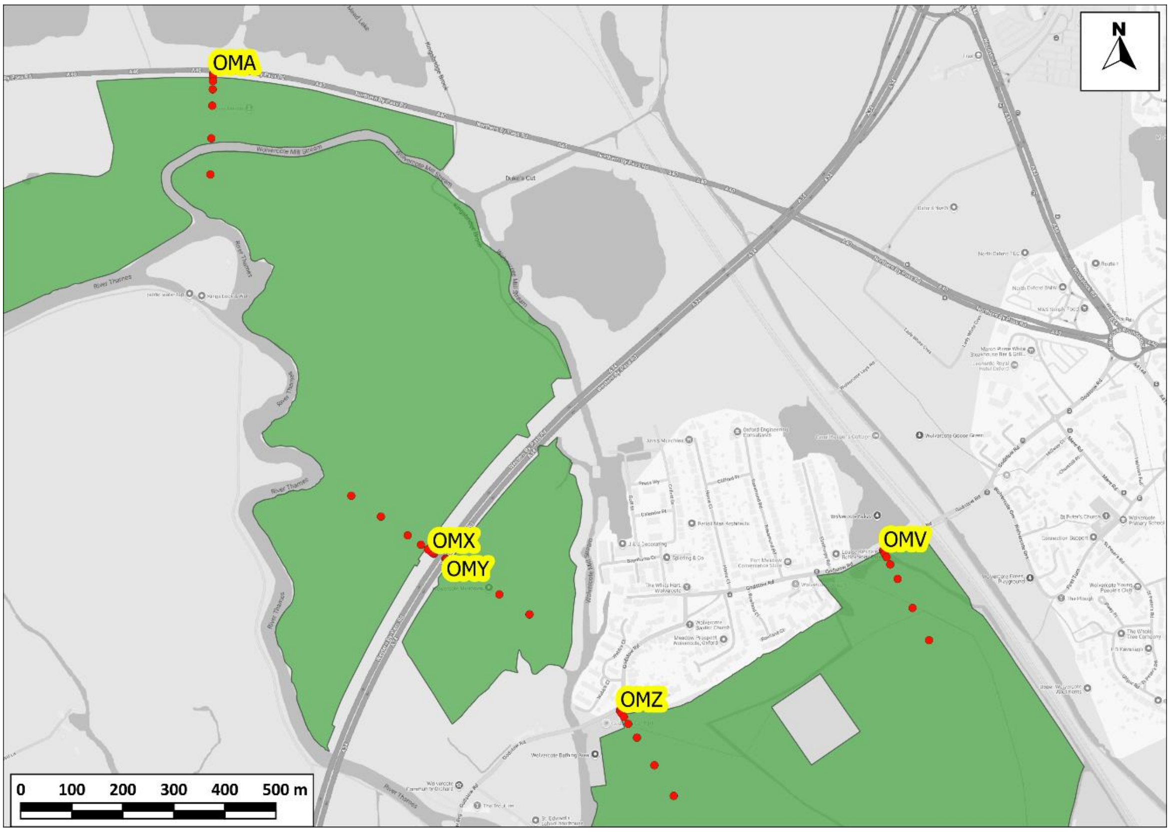

Figure 3-3: Receptor Transects in Oxford Meadows (SAC shown in Green)

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

[8] These distances are used because they broadly reflect the expected rate at which concentrations of NOx and ammonia reduce with distance from roads. This provides an efficient way to more precisely show the predicted changes.

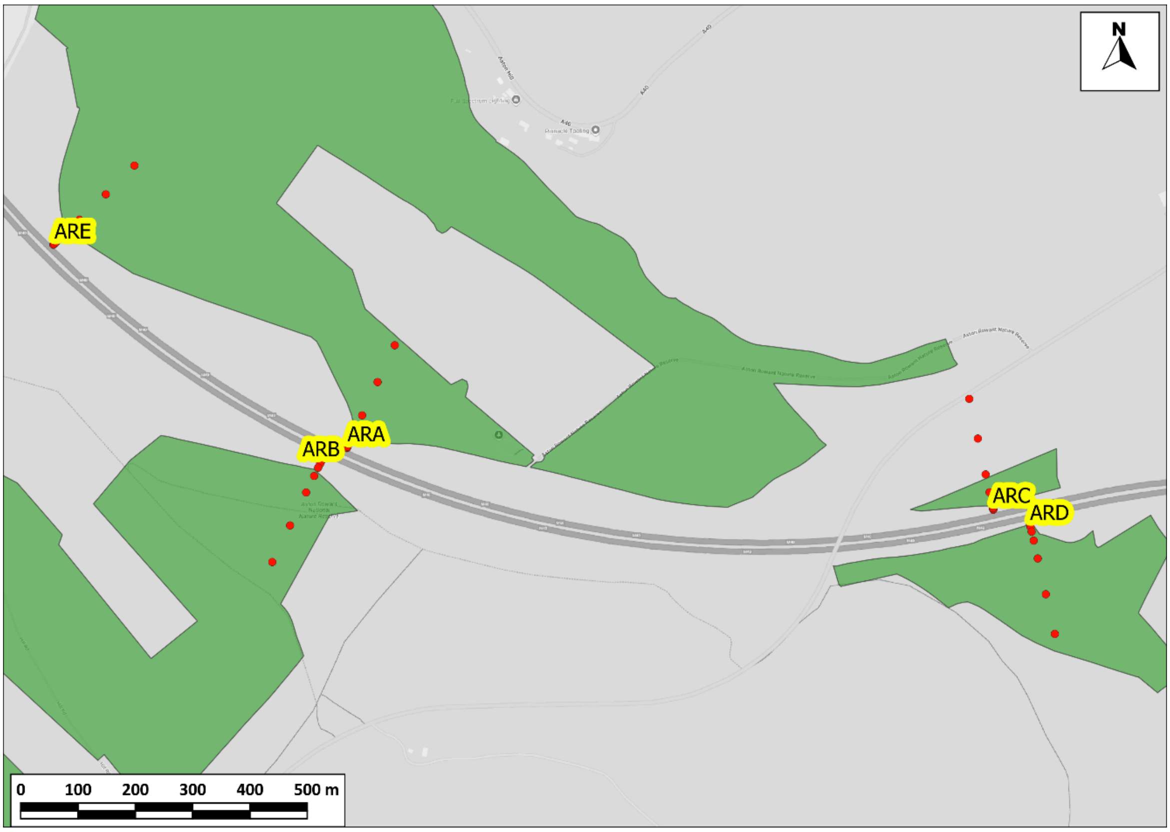

Figure 3-4: Receptor Transects in Aston Rowant (SAC shown in Green)

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

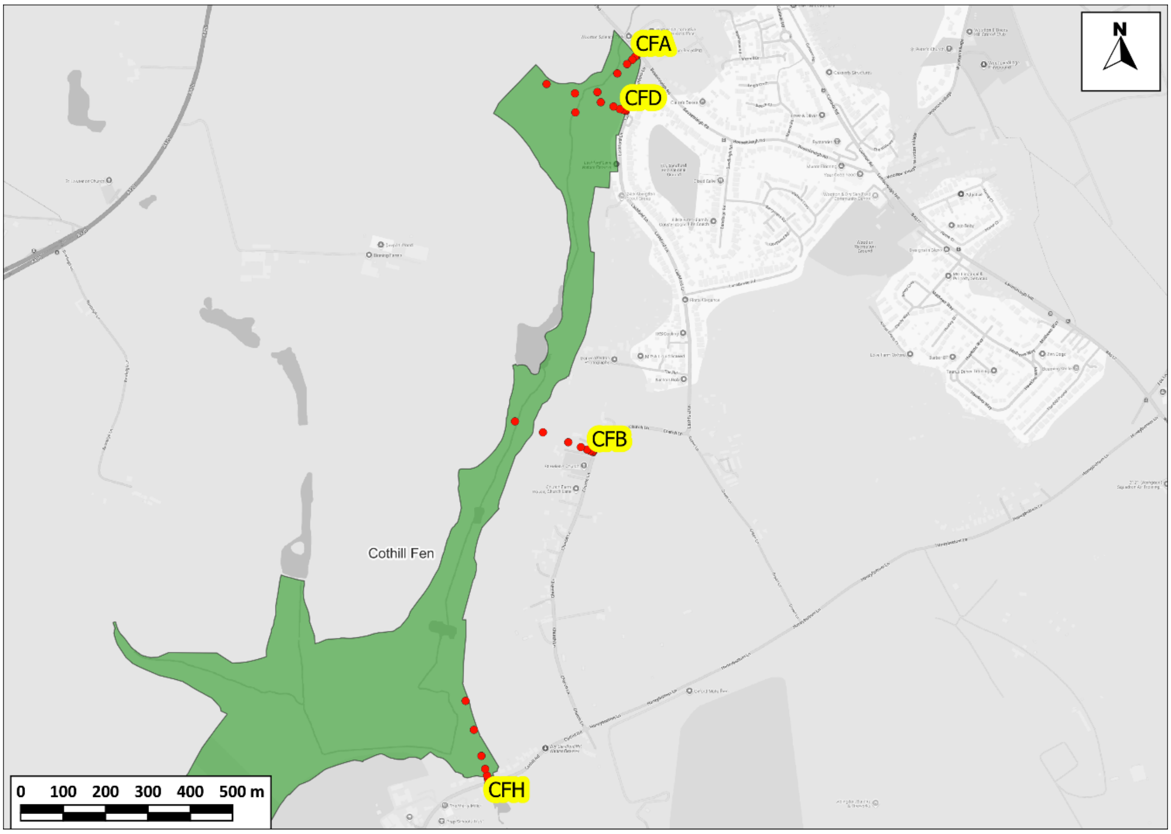

Figure 3-5: Receptor Transects in Cothill Fen (SAC shown in Green)

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

Uncertainty

3.32 There are many components that contribute to the uncertainty of modelling predictions. The road traffic emissions dispersion model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.

3.33 An important stage in the process of modelling road traffic emissions of is model verification, which involves comparing the model output with measured concentrations (see Appendix A2). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of base year (2018 - 2023) concentrations. LAQM.TG22 (Defra, 2022) provides guidance on the evaluation of model performance. Based on the analysis shown in Appendix A2, the model performance is considered to be good. There are no suitable roadside NH_3 monitoring sites in the area which can be used to verify the modelled NH_3 concentrations. Development of the CREAM model, which has been used in this assessment, included verifying the emissions model, combined with the ADMS-Roads dispersion model, against measurements from the most dense roadside NH_3 monitoring network in Europe. The modelling has thus been verified as far as is possible.

3.34 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by JNCC, DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions. Historic versions of Defra's EFT tended to over-state emissions reductions into the future. However, analyses of more recent versions of Defra's EFT carried out by AQC (2020b) (2020c) suggest that, on balance, these versions are unlikely to over-state the rate at which NOx emissions decline in the future at an 'average' site in the UK. In practice, the balance of evidence suggests that NOx concentrations are most likely to decline more quickly in the future, on average, than predicted by the current EFT, especially against a base year of 2016 or later. Whilst such an analysis has not been undertaken by AQC for EFT v13.1, it is considered that using EFT v13.1 for future-year forecasts in this report provides a robust assessment, given that the model has been verified against measurements made in 2018, 2021 and 2023.

3.35 Historically, less attention has been given to calculating emissions of NH_3 from road traffic than to calculating emissions of NOx. Future forecasts of traffic-related NH_3 are thus quite uncertain.

3.36 It should also be recognised that the deposition velocities which have been used for NH_3 may be particularly conservative. There is strong evidence that where NH_3 concentrations are high, the deposition of NH_3 can be significantly inhibited (Cape et al, 2008). The deposition velocity for NH_3 used in this assessment was developed by the Air Quality Technical Advisory Group (AQTAG) to be precautionary in most settings. Thus, close to emissions sources it is likely to have caused the deposition of NH_3 to have been over-predicted.

3.37 Only road links within 200 m of the SACs have been included explicitly within the dispersion model. The baseline contributions from all other roads are included in the background maps. This means that:

- close to other roads, baseline concentrations and deposition are likely to have been underpredicted, since the local effects of those roads are not included;
- since the modelled road sections are already included in the background maps, there will be an element of double counting baseline concentrations and deposition; and
- the effects of changes caused by the Local Plan to traffic on other roads and road sections has not been accounted for.

3.38 While these issues should be recognised, they are not considered sufficient to invalidate the conclusions that may be drawn from the predictions made in this report.

Screening Assessment Interpretation

3.39 The Environment Agency has published criteria which allow impacts from industrial developments requiring environmental permits to be rapidly screened out as insignificant (Environment Agency, 2025). Exceeding these criteria does not mean that there is a Likely Significant Effect (LSE), it simply means that further consideration is required of the potential changes to air quality or deposition. With respect to annual average impacts from most industrial sources, no further assessment is required whenever the change caused by the proposed development (the PC) is less than 1% of the relevant CLe or CLo. Furthermore, there is no need to for further assessment if detailed dispersion modelling has shown that the CLe or CLo is not exceeded (i.e. the PEC is <100% of the CLe or CLo).

3.40 Natural England's guidance on advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (Natural England, 2018) recommends the use of the Environment Agency criteria described above for changes to traffic caused by all types of plans or projects. It explains:

"the … 1% of critical load/level are considered by Natural England's air quality specialists … to be suitably precautionary, as any emissions below this level are … considered to be imperceptible". It goes on: "There can therefore be a high degree of confidence in [the use of these criteria] *to screen for risks of an effect".*

3.41 Natural England (2018) explains that the 1% criterion should be applied to plans and projects both alone and in-combination. As with the Environment Agency guidance, it is clear that exceeding 1% of the CLe or CLo does not necessarily mean that there will be an LSE, it is simply a trigger for when further assessment is needed.

3.42 The CLes and CLos are defined as "*the atmospheric deposition/concentration of atmospheric pollutants below which adverse effects on receptors such as human beings, plants, ecosystems or materials do not occur according to present scientific knowledge*" (APIS, 2025). There is therefore no reasonable scientific doubt regarding the absence of an LSE wherever the CLes and CLos are not exceeded, even where the PC exceeds the 1% criterion.

3.43 This technical modelling report has therefore applied the following tests. The potential for a significant effect can be discounted wherever:

- The PC (both alone and in-combination) is < 1% of the relevant CLe or CLo; **OR**
- The total concentration of deposition (PEC) is < the relevant CLe or CLO.

3.44 The CLos were recently subject to a detailed review and revision (Bobbink et al., 2022). However, Natural England's 2018 guidance was written prior to this revision and references earlier work (NECR210, 2016) that there may be adverse effects below the (previously published) critical loads. Because of this, Natural England (2018) requires appropriate assessment wherever the PC is >1% of the CLe or CLo and where there is a restore objective in place (which occurs where the baseline currently exceeds the CLe/Clo). This is the case even when the PEC is < the CLe or CLo. The potential for adverse effects may still be discounted where the PEC is < the CLe or CLo, but Natural England has explained that this should happen at the appropriate assessment stage. This procedural detail is addressed by UEEC (UEEC, 2025); this technical modelling report simply considers whether adverse effects can be ruled out solely on the basis of the air quality predictions, which means applying the two tests listed above. Therefore, where either of these bullets is true, the impact can, from an air quality perspective, be screened out from requiring any further assessment.

4 Dispersion Model Results

Results Along Transects

Figure 4-1 to Figure 4-14, below, show the predicted concentrations and deposition fluxes along each transect. These results are also tabulated in Appendix A3.

Oxford Meadows

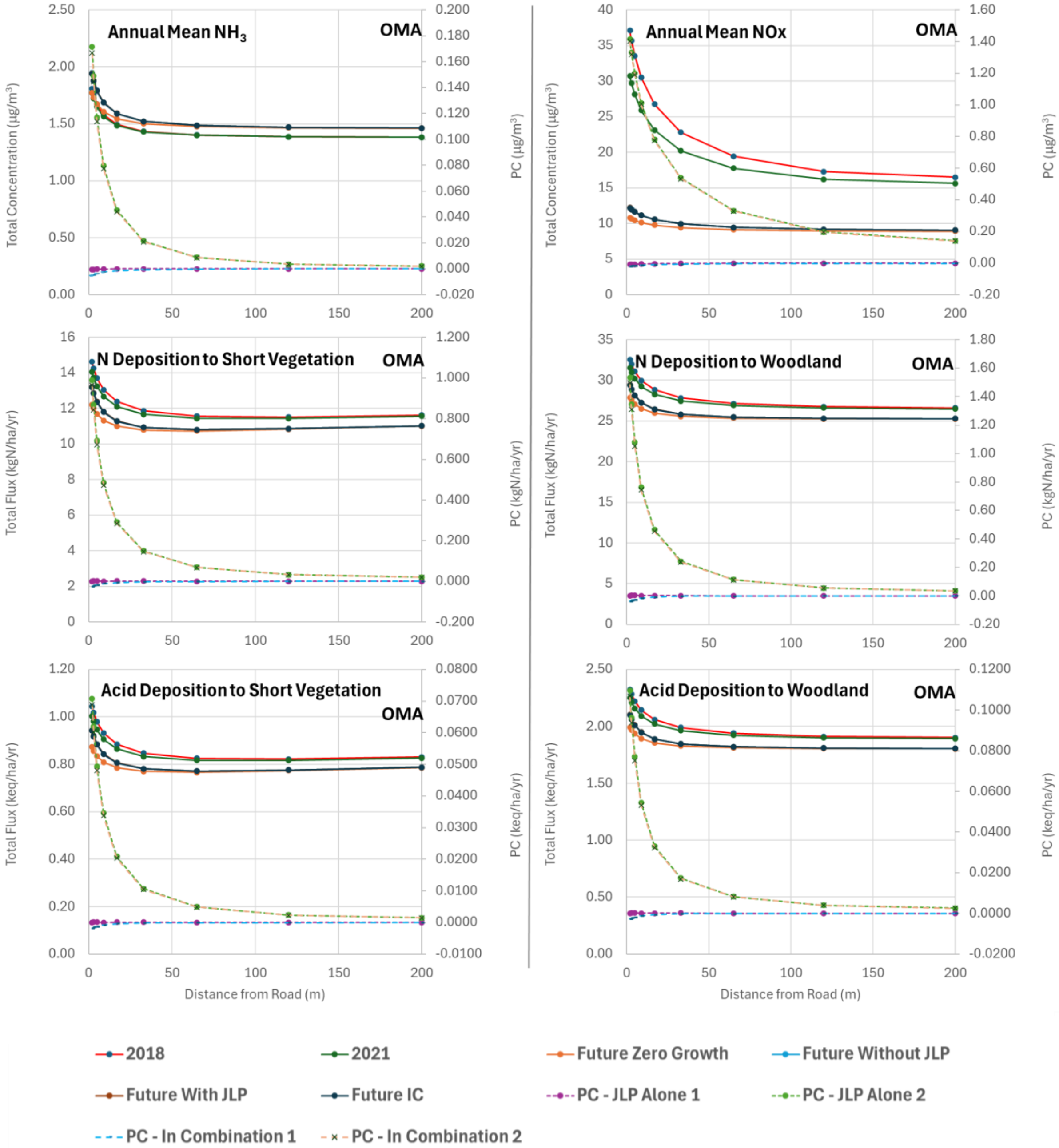

Figure 4-1: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect OMA (SAC begins 9 m from road).

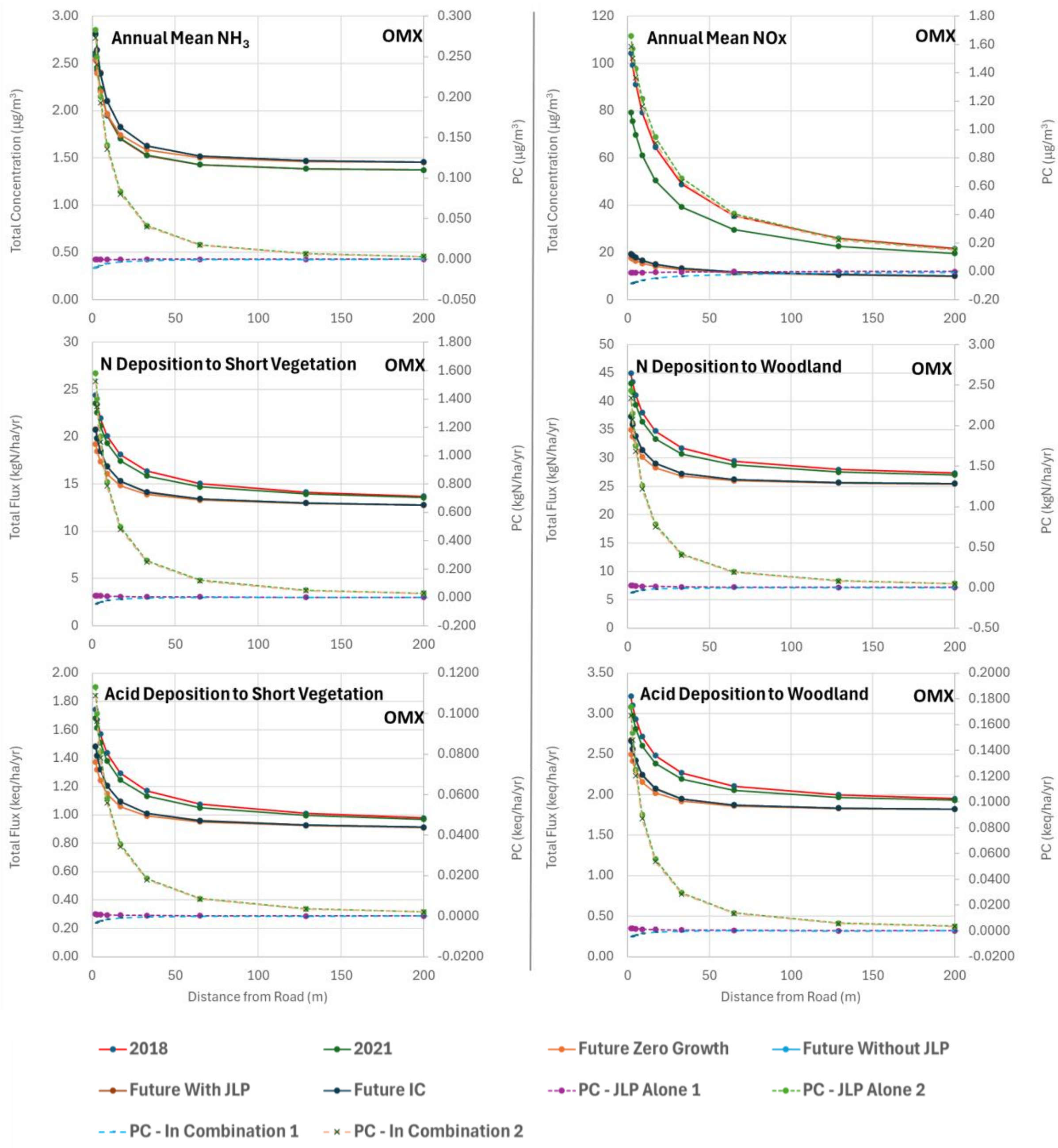

Figure 4-2: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect OMX (SAC begins 21 m from road).

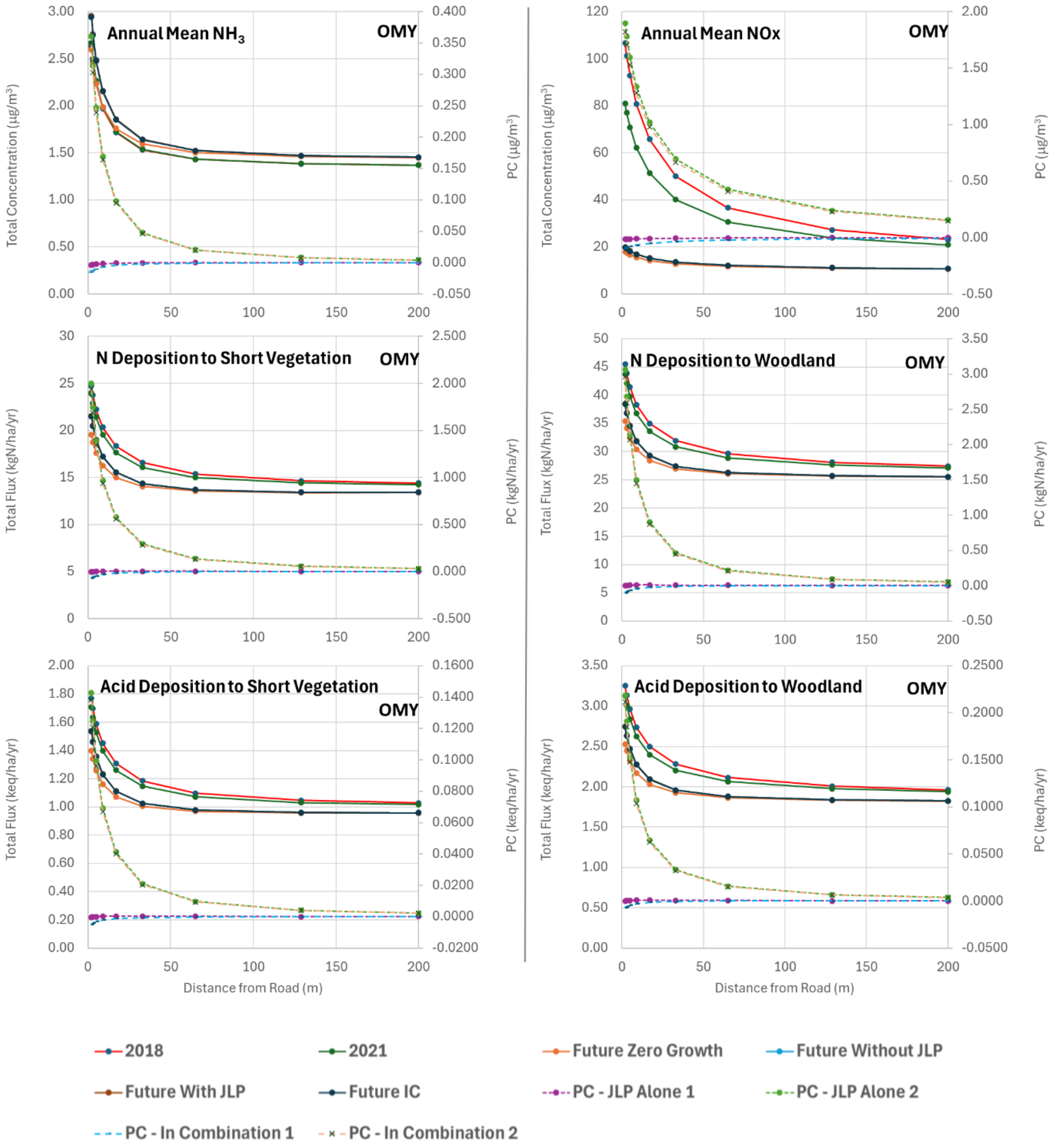

Figure 4-3: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect OMY (SAC begins 12 m from road).

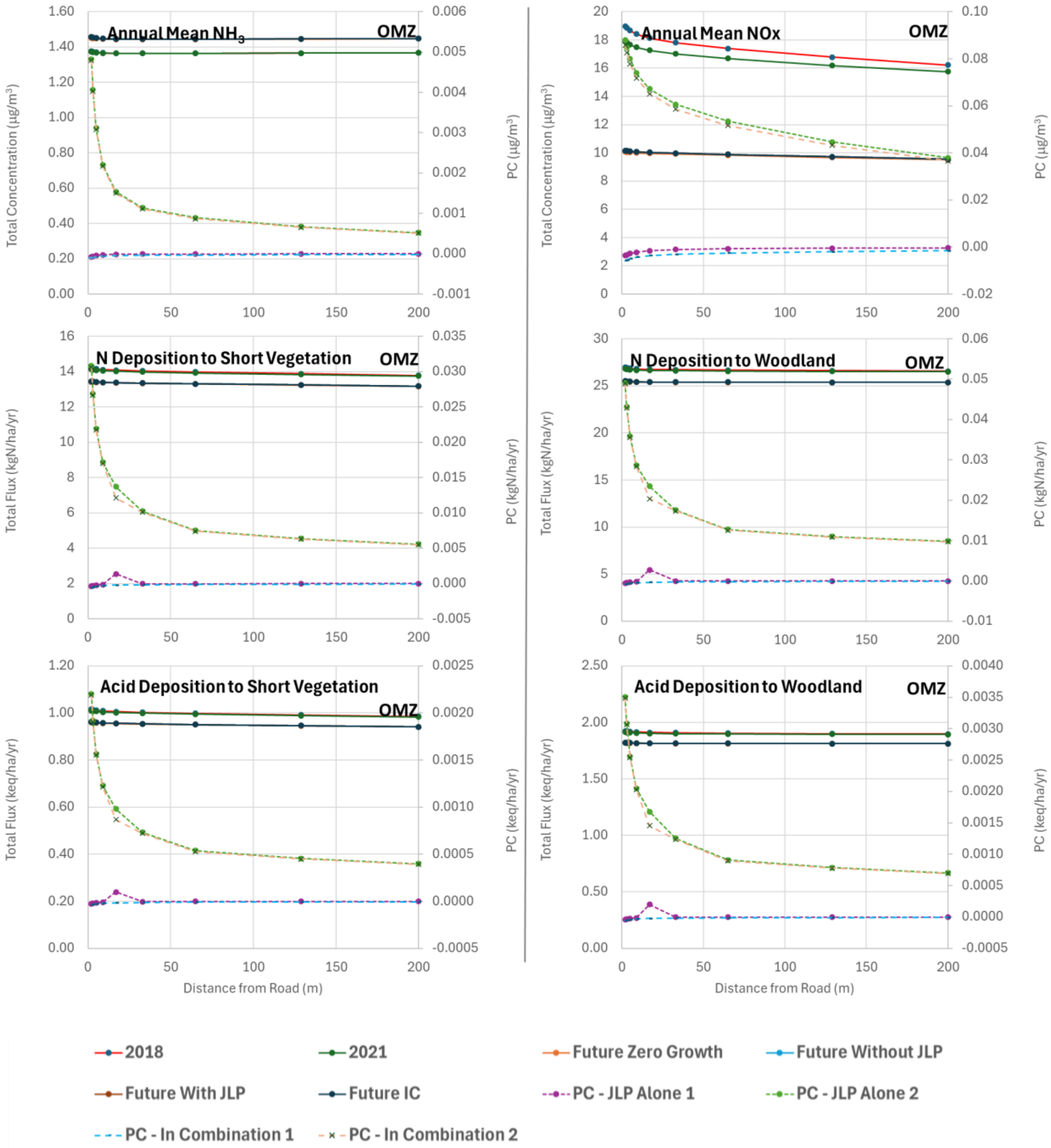

Figure 4-4: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect OMZ (SAC begins 1.5 m from road)[9]

[9] The increase in Alone 1 PCs of deposition at 17 m from the road relates to a step-change within Defra's NOx from NO_2 calculator and is only evident because the PCs are so small

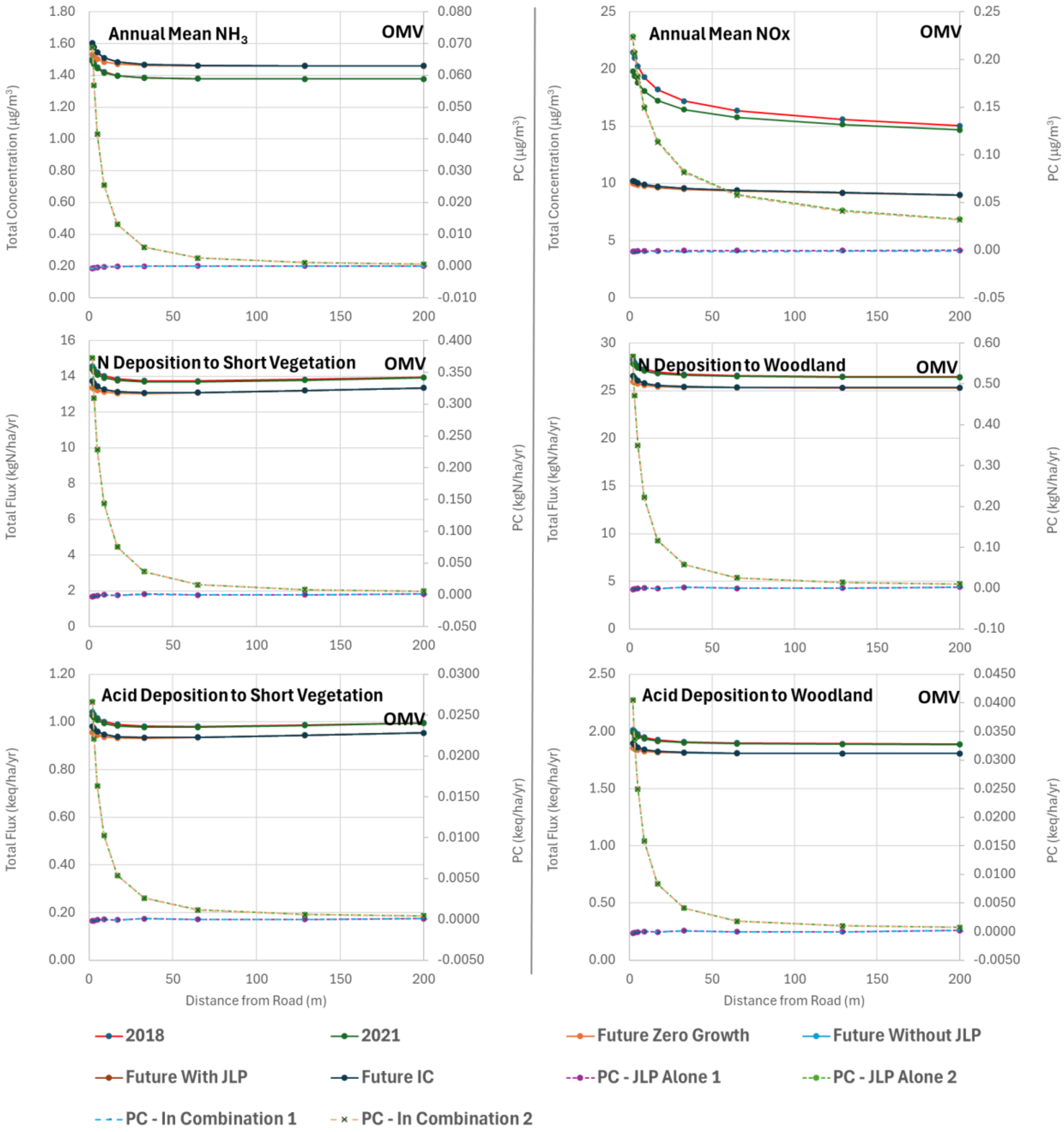

Figure 4-5: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect OMY (SAC begins 2 m from road).

Aston Rowant

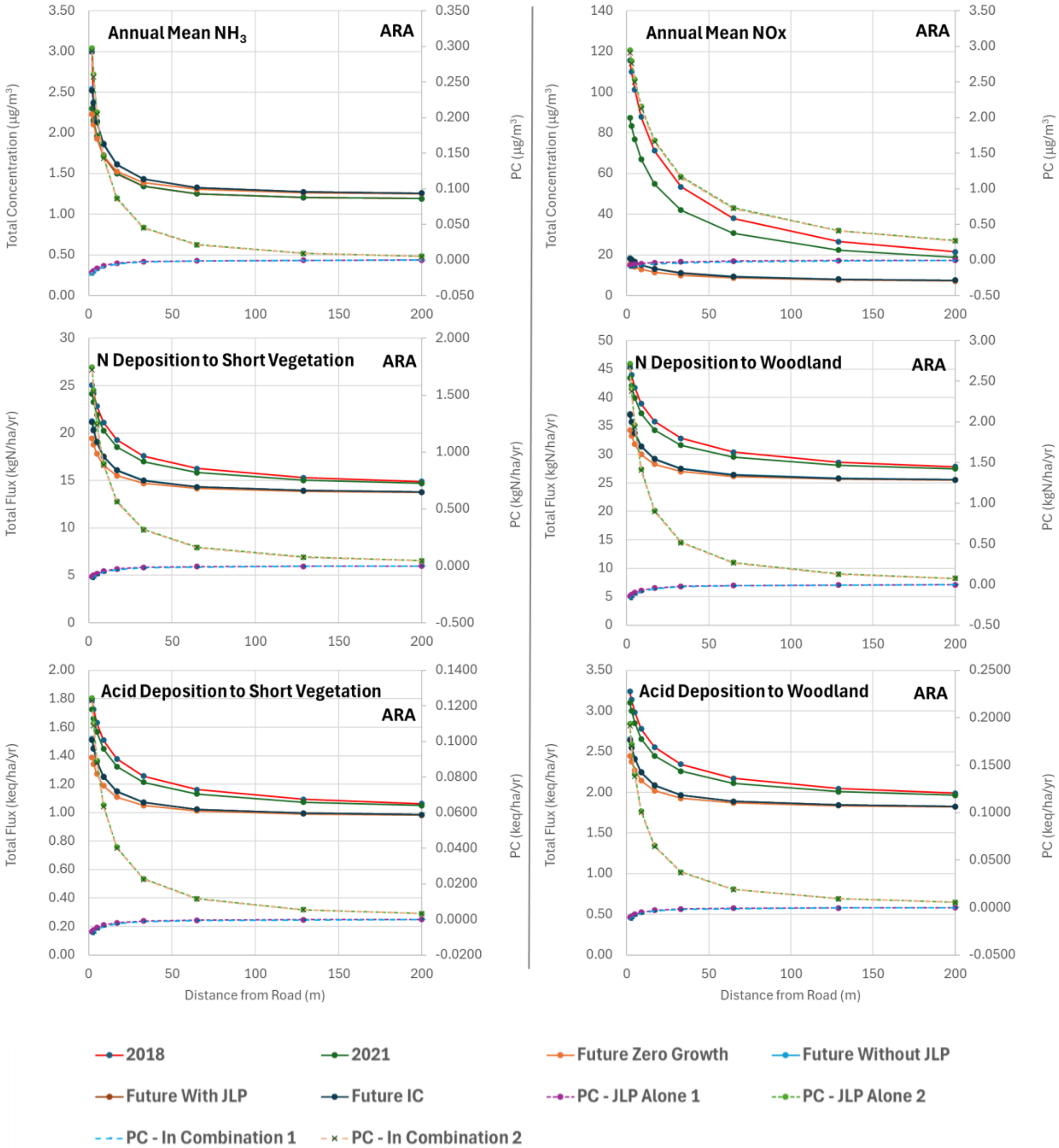

Figure 4-6: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect ARA (SAC begins 19 m from road).

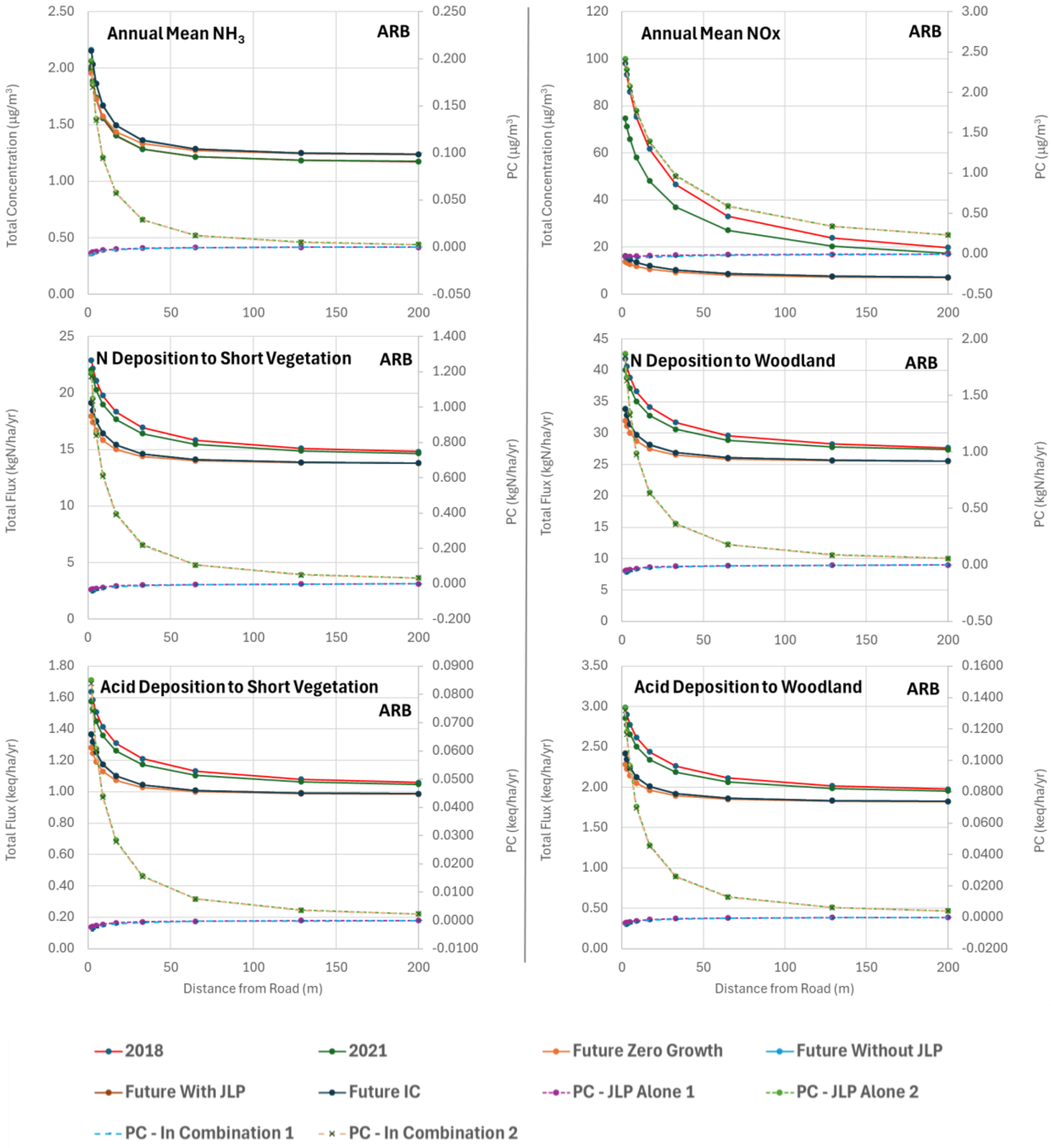

Figure 4-7: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect ARB (SAC begins 21 m from road).

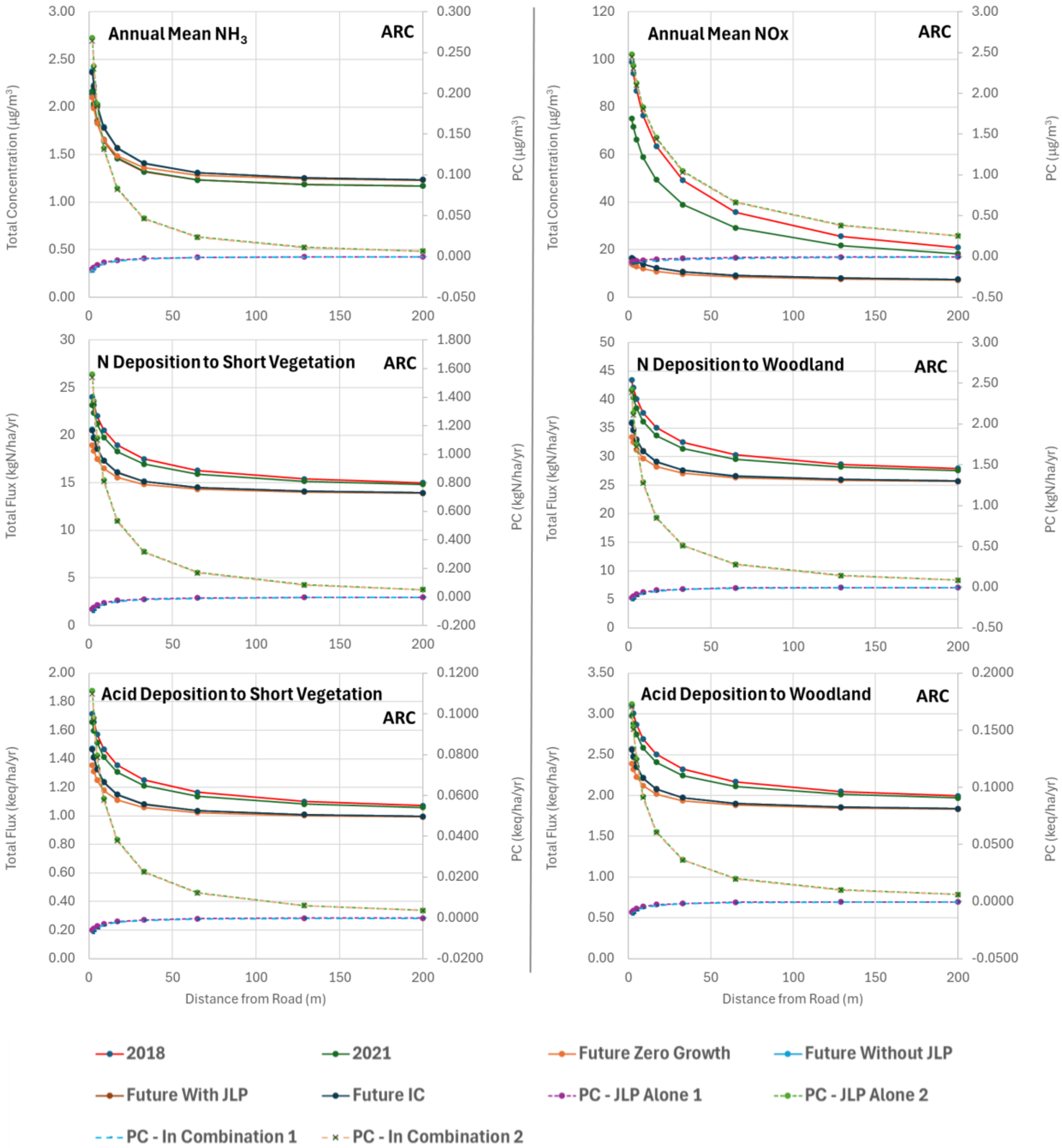

Figure 4-8: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect ARC (SAC begins 8 m from road).

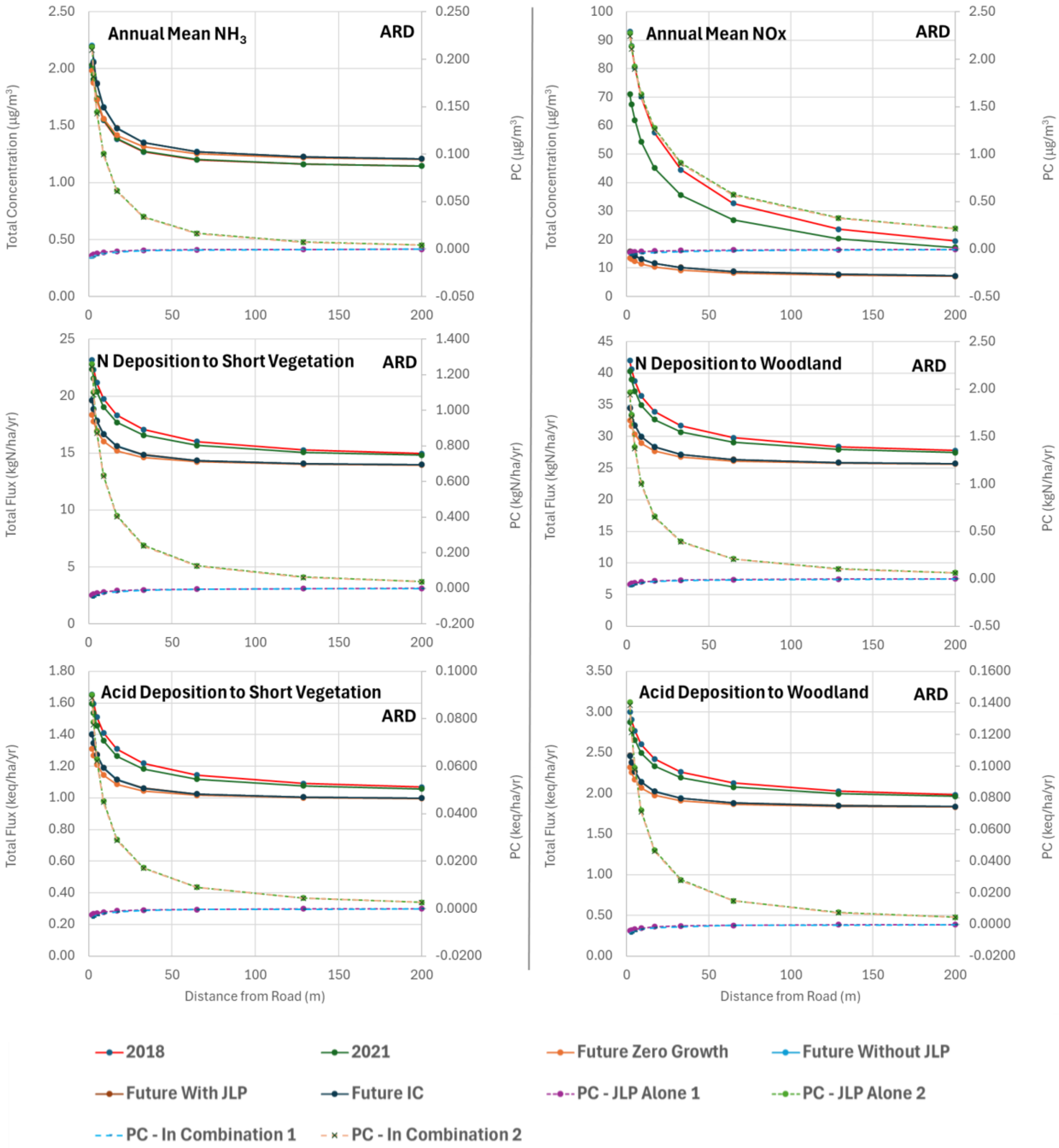

Figure 4-9: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect ARD (SAC begins 3.5 m of from road).

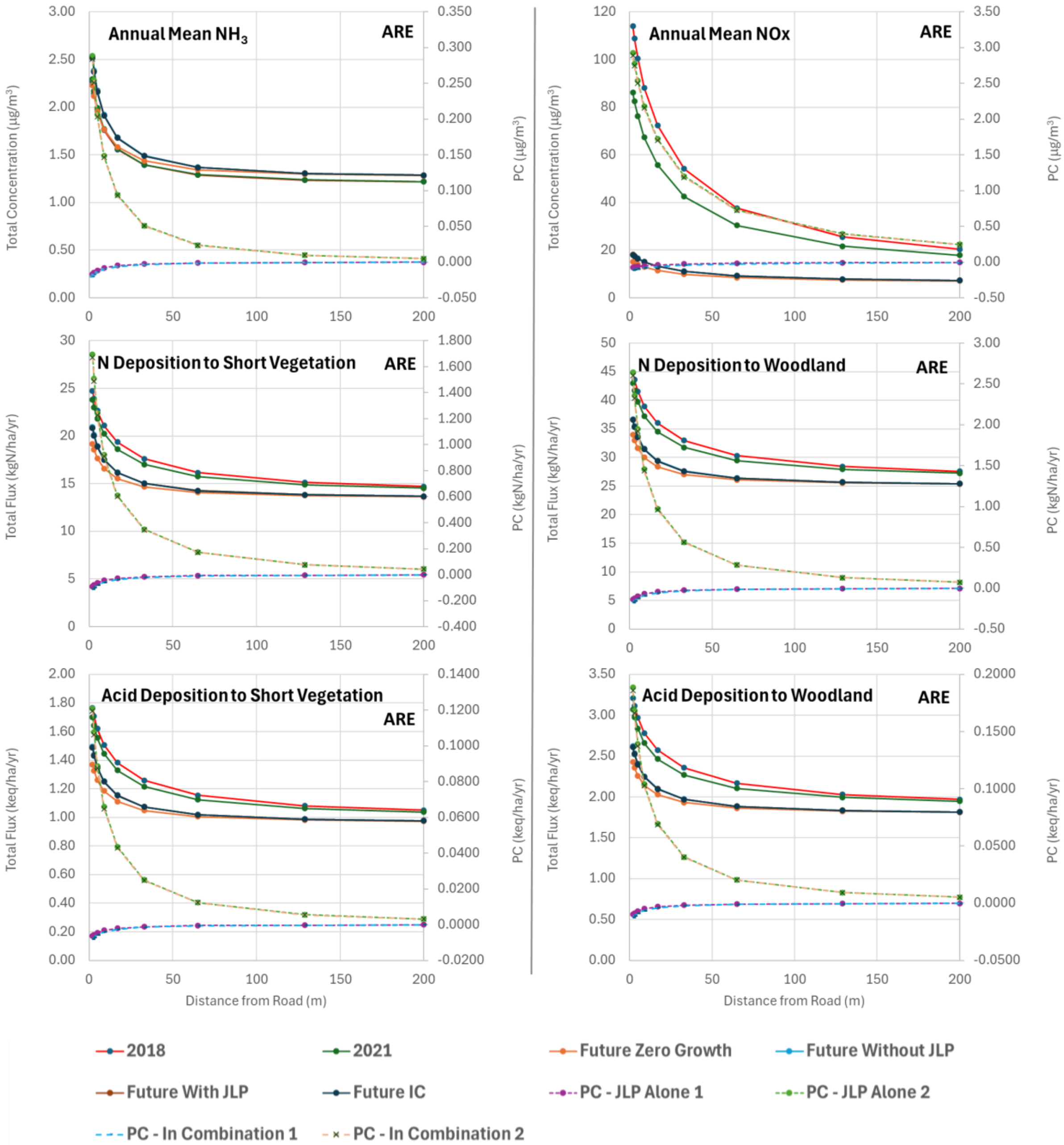

Figure 4-10: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect ARE (SAC begins 34 m from road).

Cothill Fen

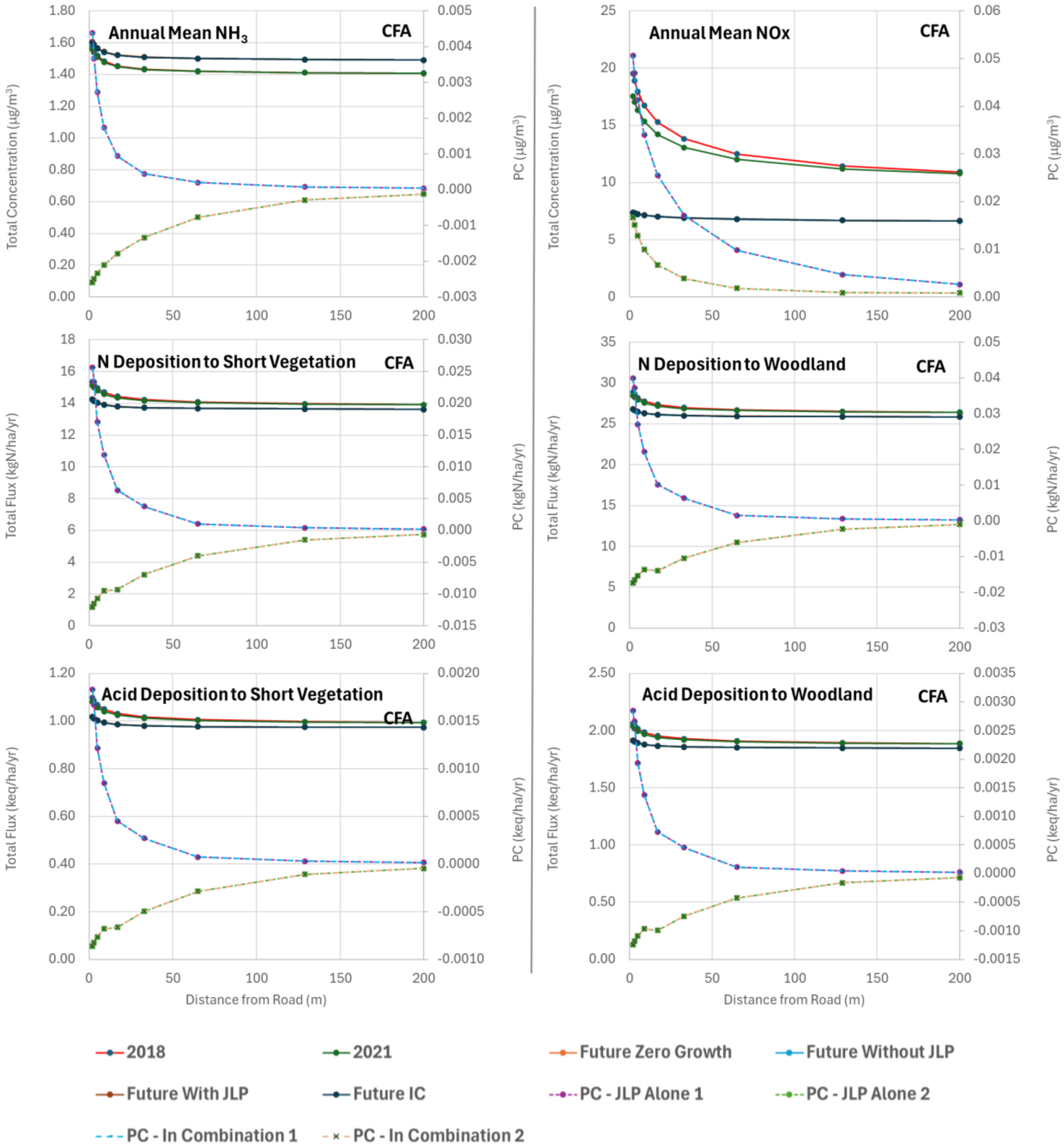

Figure 4-11: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect CFA (SAC begins 2 m from road)[10].

[10] For the 'Alone 2' and 'In combination 2' scenarios, the sign of the change is different for NOx and NH_3. This reflects differences in average vehicle speeds and fleet compositions. The plateau in deposition fluxes is the result of discontinuities in Defra's NOx to NO_2 calculator which are only evident when looking at very small changes.

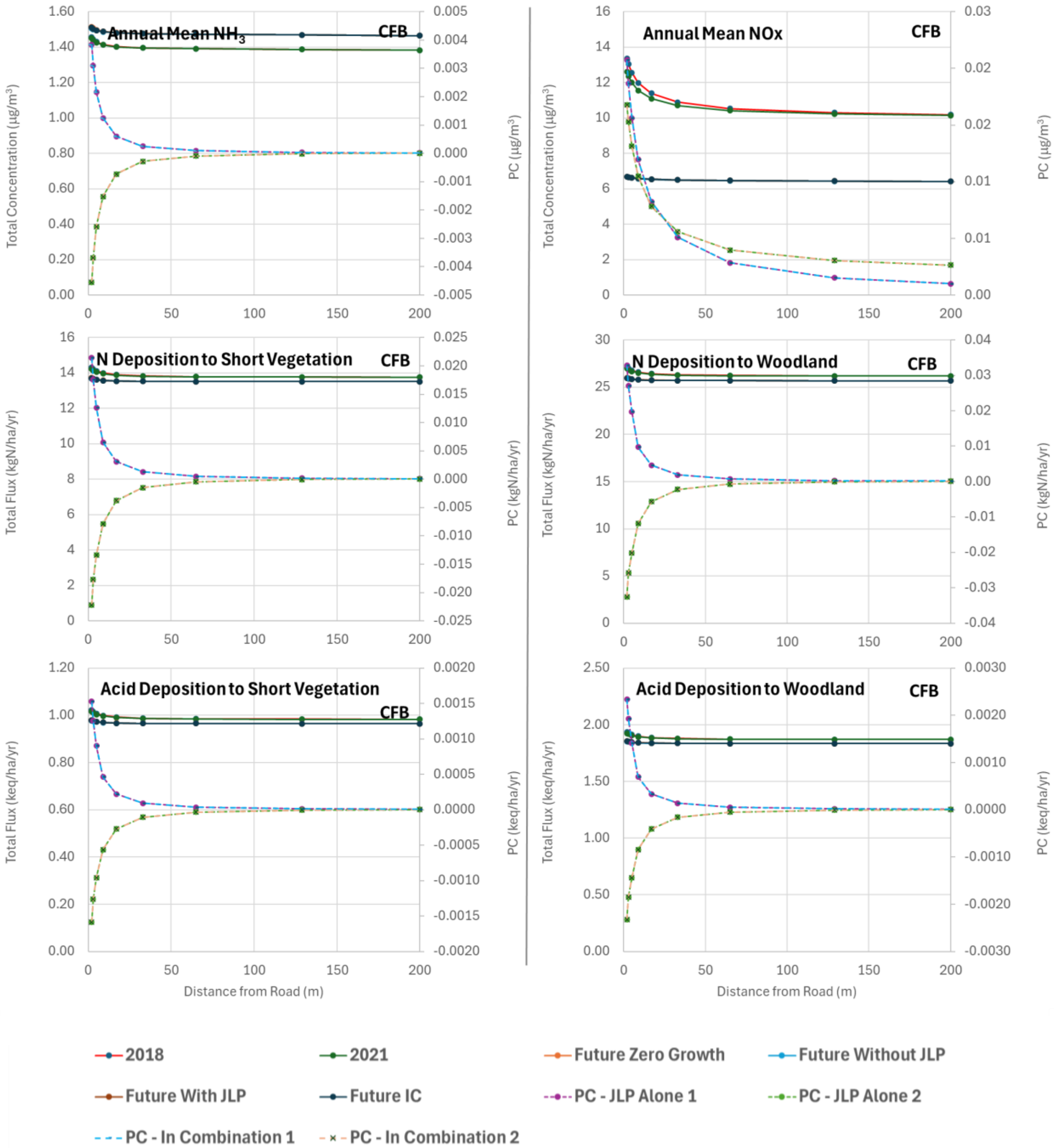

Figure 4-12: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect CFB (SAC begins 151 m from road).

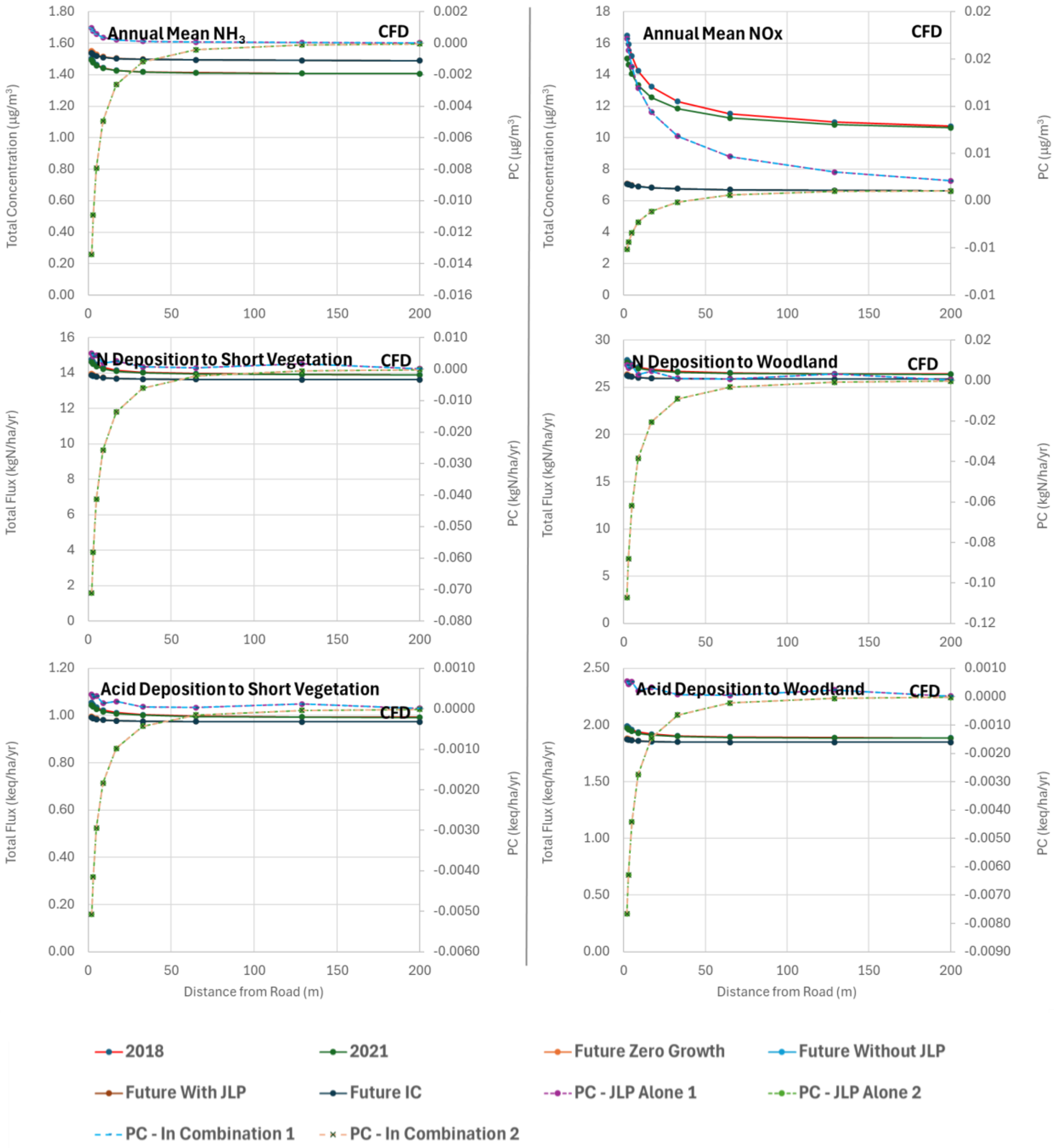

Figure 4-13: Predicted PECs (solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect CFD (SAC begins 1 m from road).

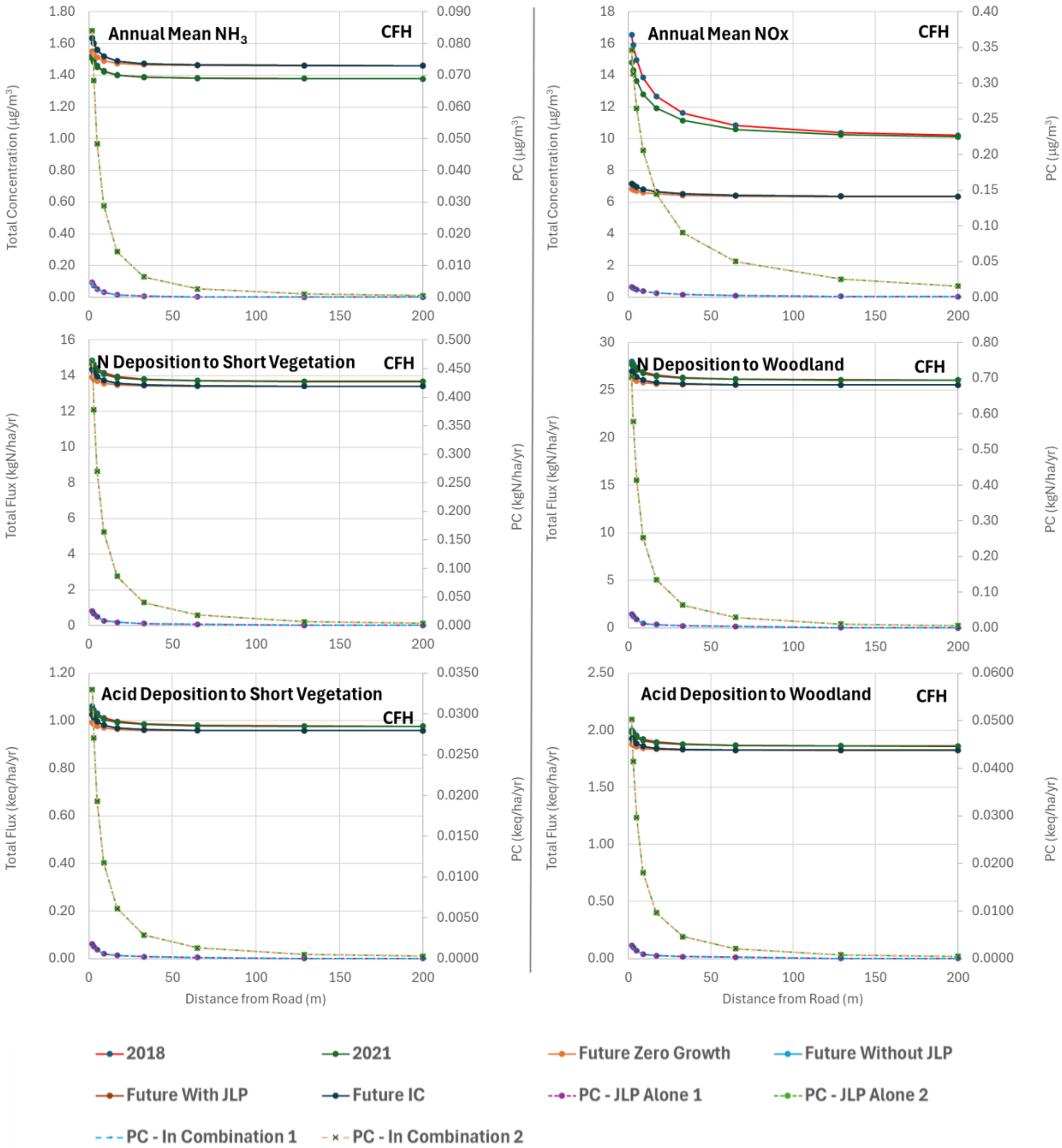

Figure 4-14: Predicted PECs (Solid lines and left-hand axes) and PCs (dashed lines and right-hand axes) on Transect CFH (SAC begins 11 m from road).

Retardation

4.1 Nitrogen deposition in the future with the JLP will be less than in 2021. This is because of natural turnover of the vehicle fleet as well the response to policies to reduce emissions from many other sectors across Europe. Natural England has requested that the degree of 'retardation' to ongoing reductions in nitrogen deposition should be calculated, and that this should be done assuming a linear trajectory between 2021 and 2041 which also continues at the same rate after 2041[11]. This calculation has focused on the Oxford Meadows transect with the highest PC, which is transect OMY. The qualifying habitat at transect OMY begins 12 m from the edge of the road, and so the calculation is provided for all transect points from 9 m from the road.

4.2 As explained in Paragraph 3.26, background deposition has been assumed to change between 2021 and 2041 based on JNCC's Nitrogen Futures Business-as-Usual modelling, but only allowing 9 years of change because Nitrogen Futures did not make predictions beyond 2030. The total reductions to 2041 are therefore highly likely to have been under-predicted, which makes the 'retardation' calculation particularly worst-case.

4.3 The first step of the 'retardation' calculation is to show the magnitude of improvement which is forecast between 2021 and the Future Zero Growth scenario, and between 2021 and the Future With JLP scenario. These improvements are shown in Table 6, expressed both as the 20-year total and as the change per year. For example, deposition in 2041 at 9 m from the road is expected to be 3.3 kg-N/ha/yr lower than in 2021 if there is no increase in traffic over this 20-year period. With the JLP and all other traffic growth, deposition will be 2.3 kg-N/ha/yr lower than in 2021.

Table 6: Reduction in Nitrogen Deposition between 2021 and 2041 at Selected Locations on Transect OMY, in kg-N/ha/yr [a]

Dist from Road (m)	Change from 2021 to 'Future Zero Growth'		Change from 2021 to 'Future With JLP'	
	over 20 years	per year	over 20 years	per year
9	-3.3	-0.16	-2.3	-0.12
17	-2.7	-0.13	-2.1	-0.10
33	-2.0	-0.10	-1.7	-0.09
65	-1.4	-0.07	-1.3	-0.07
129	-1.0	-0.05	-1.0	-0.05
200	-0.9	-0.04	-0.8	-0.04

[a] values are shown as negatives since they are reductions over time.

4.4 The next step is to divide the PC by the 'per year' improvements to the Future Zero Growth scenario. These results are shown in Table 7. The Alone 1 scenario will retard the improvements by between 0.02 and 0.05 years (i.e. 8 to 18 days). The Alone 2 scenario will retard the improvements by between 0.7 and 5.9 years.

4.5 It should be stressed that the Alone 2 calculation is highly precautionary since it includes all traffic growth between 2018 and 2041 and not just the effect of development in South and Vale (or just the

[11] In practice, the first of these assumptions is invalid and the second one is also unlikely to be true, however Natural England explained that the calculation is nevertheless required and that this is the best approach possible.

growth from 2021). The expected reduction in nitrogen deposition in the future is also likely to have been underestimated because it has used JNCC's Business-as-Usual assumptions to 2030. While this is the only approach to using JNCC's forecasts which Natural England currently agrees, it assumes that the UK will break long-standing legal commitments to reduce emissions by 2030. Further improvements between 2030 and 2041 are also not included. Regarding the years after 2041, which are invoked by the concept of a 'delay' while these years have not been modelled, it is reasonable to expect a significant volume of electric vehicles in the fleet by this time, which have no local emissions of NOx or NH_3. This means that the years of delay statistics are likely to have been overpredicted.

Table 7: Years Delay to Reductions in Nitrogen Deposition at Selected Locations on Transect OMY, in kg-N/ha/yr

Dist from Road (m)	Alone 1		Alone 2	
	PC (kg/N/ha/yr)	Years Delay[a]	PC (kg/N/ha/yr)	Years Delay[a]
9	0.004	0.02	0.97	5.9
17	0.005	0.03	0.58	4.4
33	0.004	0.04	0.29	2.9
65	0.004	0.05	0.14	1.9
129	0.001	0.02	0.06	1.1
200	0.001	0.03	0.03	0.7

[a] i.e. the PC divided by the 'per year' reductions to the Future Zero Growth scenario.

Summary

4.6 Taking account of the results presented in Figure 4-1 to Figure 4-14, the position of each SAC in relation to the full length of each road, the relevant CLes and CLos which apply to each area, and the screening approach defined in Paragraph 3.43, Table 8 summarises the air quality predictions for each pollutant at each designated site.

Table 8: Summary of Air Quality Predictions for all Pollutants

Pollutant	CLe/ CLo	Observations			SO[a]
		Alone 1	Alone 2	In Com~	
Oxford Meadows					
NH_3	3	PCs <1% of CLe therefore no LSE	PCs >1% of CLe, but total concentrations < CLe therefore no LSE	PC < Alone	Y
NOx	30	PCs <1% of CLe therefore no LSE	PCs >1% of CLe, but total concentrations < CLe therefore no LSE	PC < Alone	Y
N Dep (sv[b])	10-20	PCs <1% of lower CLo therefore no LSE	PC >1% of lower and upper Clo. Total > lower Clo but < upper CLo. Deposition with JLP will remain < present (i.e. continued net improvement over time)	PC < Alone	N
Acid Dep (sv[b])	4.856	All PCs <1% of CLo and total fluxes < CLo therefore no LSE			Y
Aston Rowant					
NH_3	3	PCs <1% of CLe therefore no LSE	PCs >1% of CLe, but total concentrations < CLe therefore no LSE	PC < Alone	Y
NOx	30	PCs <1% of CLe therefore no LSE	PCs >1% of CLe, but total concentrations < CLe therefore no LSE	PC < Alone	Y
N Dep (sv[b])	10-20	PCs <1% of lower CLo therefore no LSE	PC >1% of lower and upper Clos. Total > lower Clo but < upper CLo. Deposition with JLP will remain < present (i.e. continued net improvement over time)	PC < Alone	N
N Dep (w[c])	10-15	PCs <1% of lower CLo therefore no LSE	PC >1% of lower and upper Clo and total > lower and upper Clo. Deposition with JLP will remain < present (i.e. continued net improvement over time).	PC < Alone	N
Acid Dep (sv[b])	4.856	PCs <1% of CLo therefore no LSE	PCs >1% of CLo, but total < CLo therefore no LSE	PC < Alone	Y
Acid Dep (w[c])	1.905	PCs <1% of CLo therefore no LSE	PC >1% of Clo and total > CLo. Deposition with JLP will remain < present (i.e. continued net improvement over time).	PC < Alone	N

Pollutant	CLe/ CLo	Observations			SO[a]
		Alone 1	**Alone 2**	**In Com~**	
Cothill Fen					
NH_3	1	PCs < 1% of CLe therefore no LSE	PC > 1% of CLe and total > CLe. This is at the southeast corner of the SAC only.	PC = Alone	**N**
NOx	30	All PCs < 1% of CLe and all future-year total concentrations < CLe therefore no LSE			**Y**
N Dep (sv[b])	15-25	All PCs < 1% of lower CLe and totals < lower CLe therefore no LSE			**Y**
Acid Dep (sv[b])	4.856	All PCs < 1% of CLo and all future-year total concentrations < CLo therefore no LSE			**Y**

~ Comments hold for both in-combination scenarios (i.e. in-combination 1 is </= to Alone 1, and in-combination 2 is </= to Alone 2).

[a] SO - Screened Out from further assessment.

[b] sv = deposition to short semi-natural vegetation.

[c] w = deposition to woodland (there is no woodland habitat with relevant CLos in Oxford Meadows).

4.7 On the basis of the observations in Table 8, and noting the procedural caveat in Paragraph 3.44, it is possible to screen out from further assessment all impacts apart from:

- Oxford Meadows - nitrogen deposition to short vegetation;
- Aston Rowant - nitrogen deposition to both short vegetation and woodland, and acid deposition to woodland; and
- Cothill Fen – NH_3 concentrations.

4.8 For these sites/pollutants, further assessment is needed before the potential for an LSE can be discounted.

5 Isopleths

5.1 Because Table 8 was unable to screen out all of the impacts as insignificant, isopleths have been plotted to show the areas over which the 1% of CLe/CLo screening criterion is exceeded in the 'Alone 2' scenario. These are presented in Figure 15 to Figure 20, below. Isopleths are shown only for the 'Alone 2' scenario because this represents a worst-case (there are no exceedances of 1% in the 'Alone 1' or 'In-combination 1' scenarios and the PC's for the 'In-combination 2' scenario are marginally smaller than those for 'Alone 2'. For completeness, isopleths are shown wherever the 1% criterion is exceeded within an SAC, even where the potential for an LSE has already been discounted on the basis that the PEC does not exceed the CLe or CLo. Isopleths are not shown if the 1% criterion is not exceeded. It should be reiterated that exceeding the 1% criterion does not mean that there will be an LSE. It simply means that impacts cannot be screened out at this stage. However, an LSE can be discounted to all areas <u>outside</u> the lines shown in Figure 15 to Figure 20.

5.2 Some important points should be understood when interpreting these isopleths:

- the 'Alone 2' scenario includes all traffic growth from adopted Plans in Oxfordshire, as well as TEMPro growth for the rest of the UK, over the period 2018 to 2041. The A34, A40, and particularly the M40, carry traffic with origins and destinations across the UK. The isopleths show the combined effect of all traffic growth on these strategic routes over a 23-year period and not just the effect of development in South and Vale.
- the effect of adopting the JLP (when compared with the alternative of not adopting the JLP) is shown by scenario 'Alone 1', in which there are no exceedances of the 1% criterion.
- as shown in Section 4, wherever there is an exceedance of the 1% screening criterion and the CLe/CLo is exceeded, all concentrations and deposition in 2041 with the JLP will remain lower than they were in both 2018 and 2021. There will not, therefore, be a net increase over time. Air quality will continue to improve over time regardless of whether the JLP is adopted. The assessed traffic growth can be seen as retarding this improvement rather than generating a net adverse change.

5.3 Further interpretation of these data is provided by UEEC (2025).

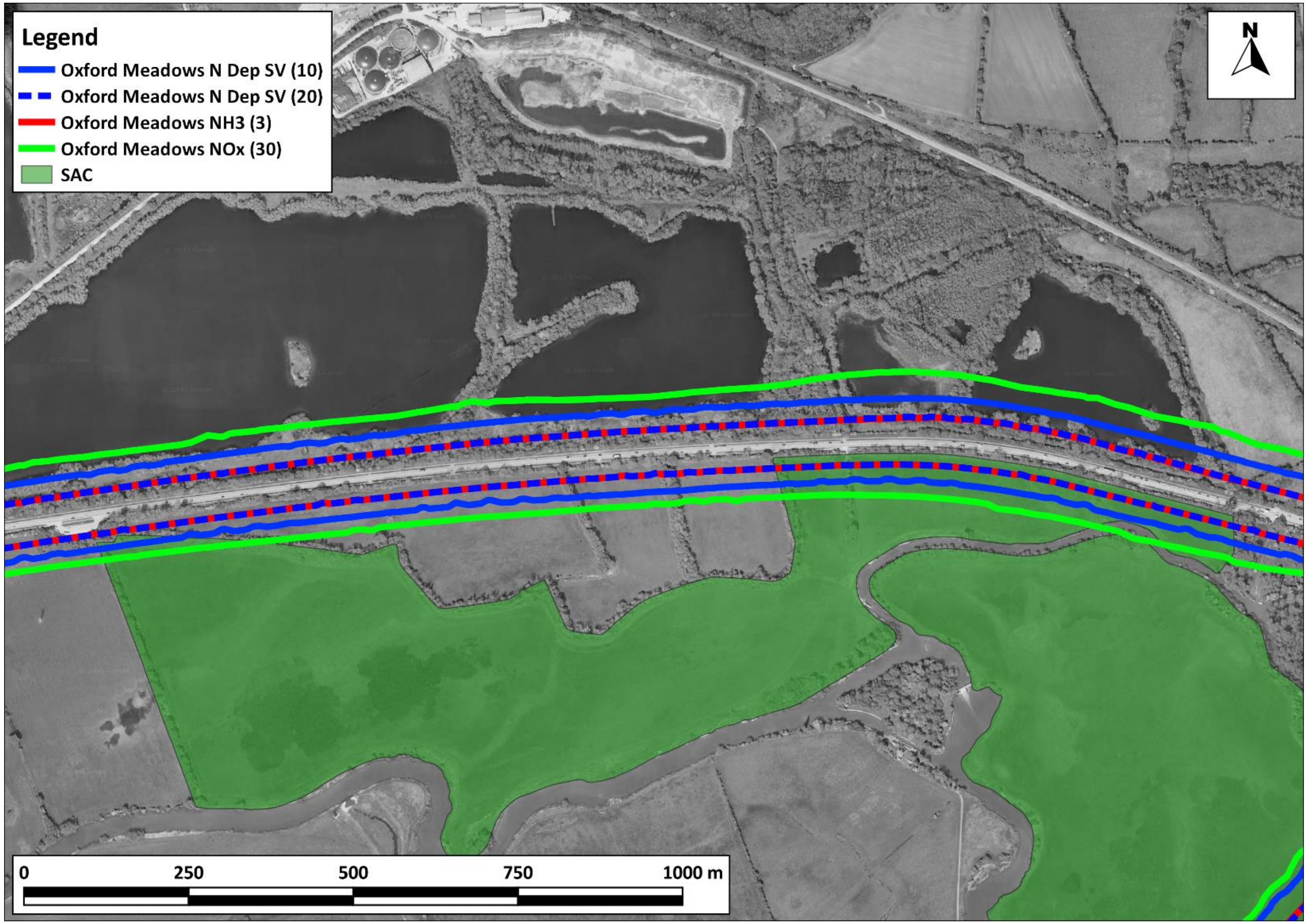

Figure 15: Areas Exceeding 1% of CLes or CLos Beside A40 at Oxford Meadows in 'Alone 2' (CLe and CLo value shown in parenthesis)

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0. Imagery ©2025 Airbus, Landsat / Copernicus, Maxar Technologies, Map data ©2025

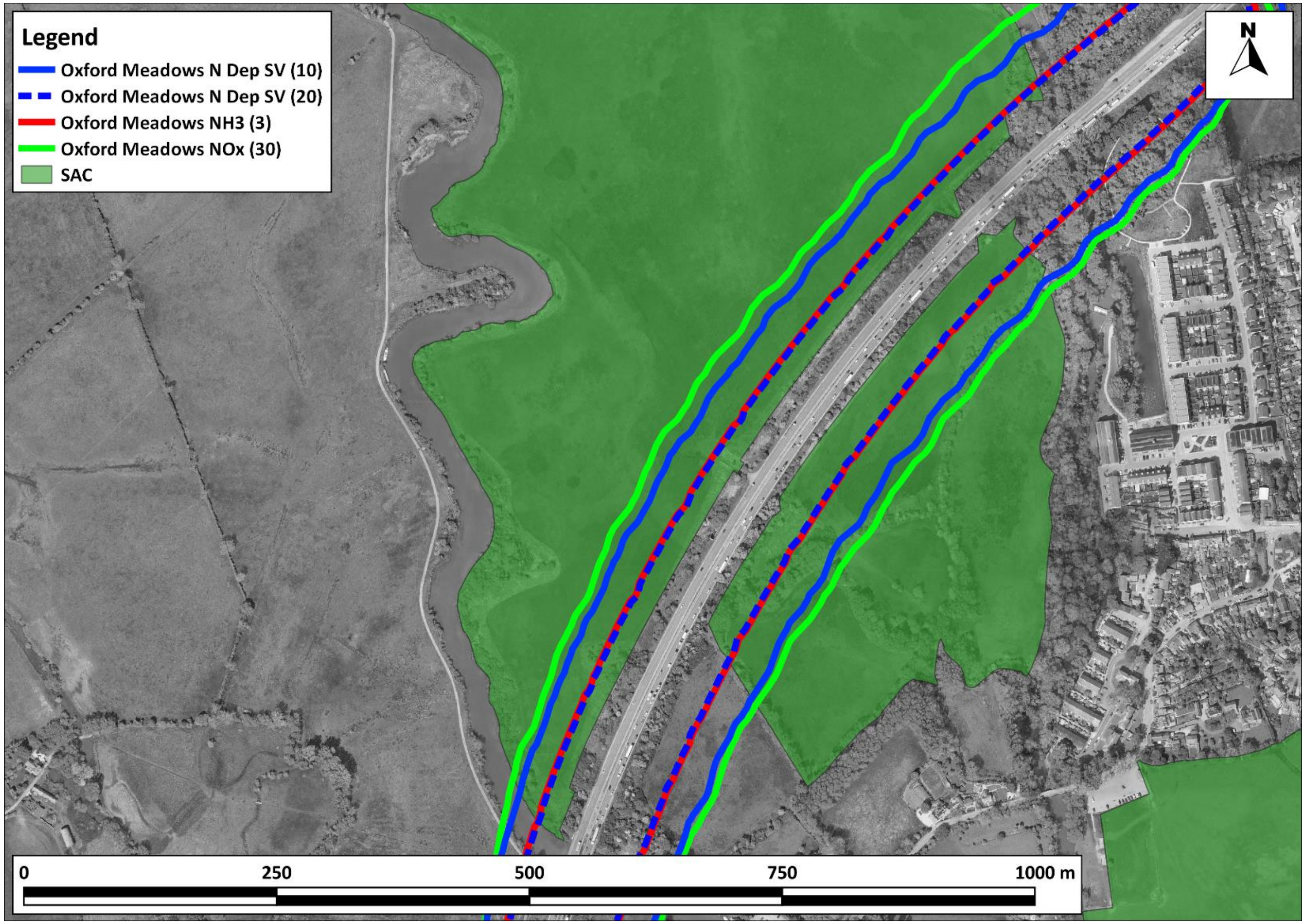

Figure 22: Areas Exceeding 1% of CLes or CLos Beside A34 at Oxford Meadows in 'Alone 2' (CLe and CLo value shown in parenthesis)

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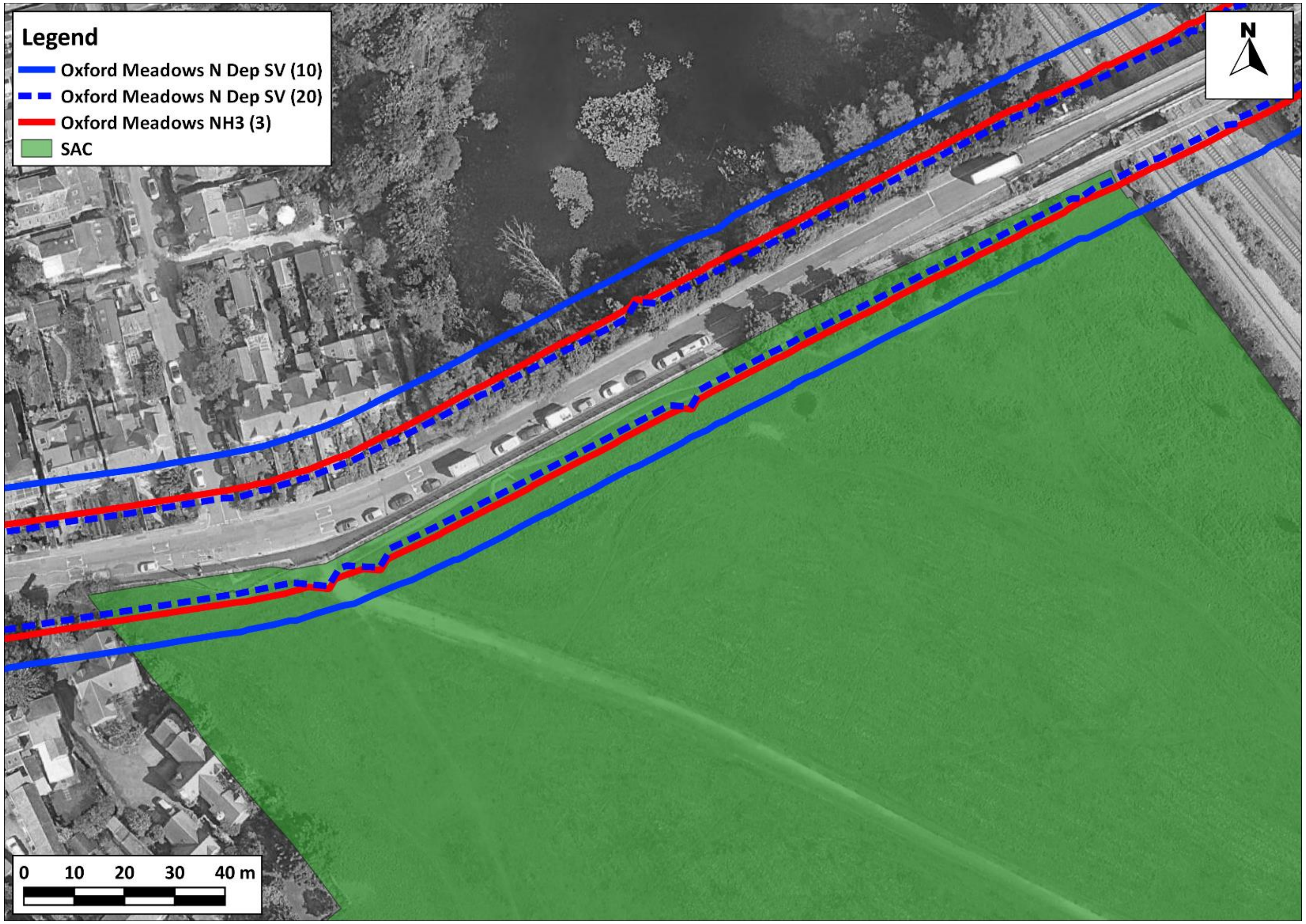

Figure 23: Areas Exceeding 1% of CLes or CLos Beside Godstow Road at Oxford Meadows in 'Alone 2' (CLe and CLo value shown in parenthesis)

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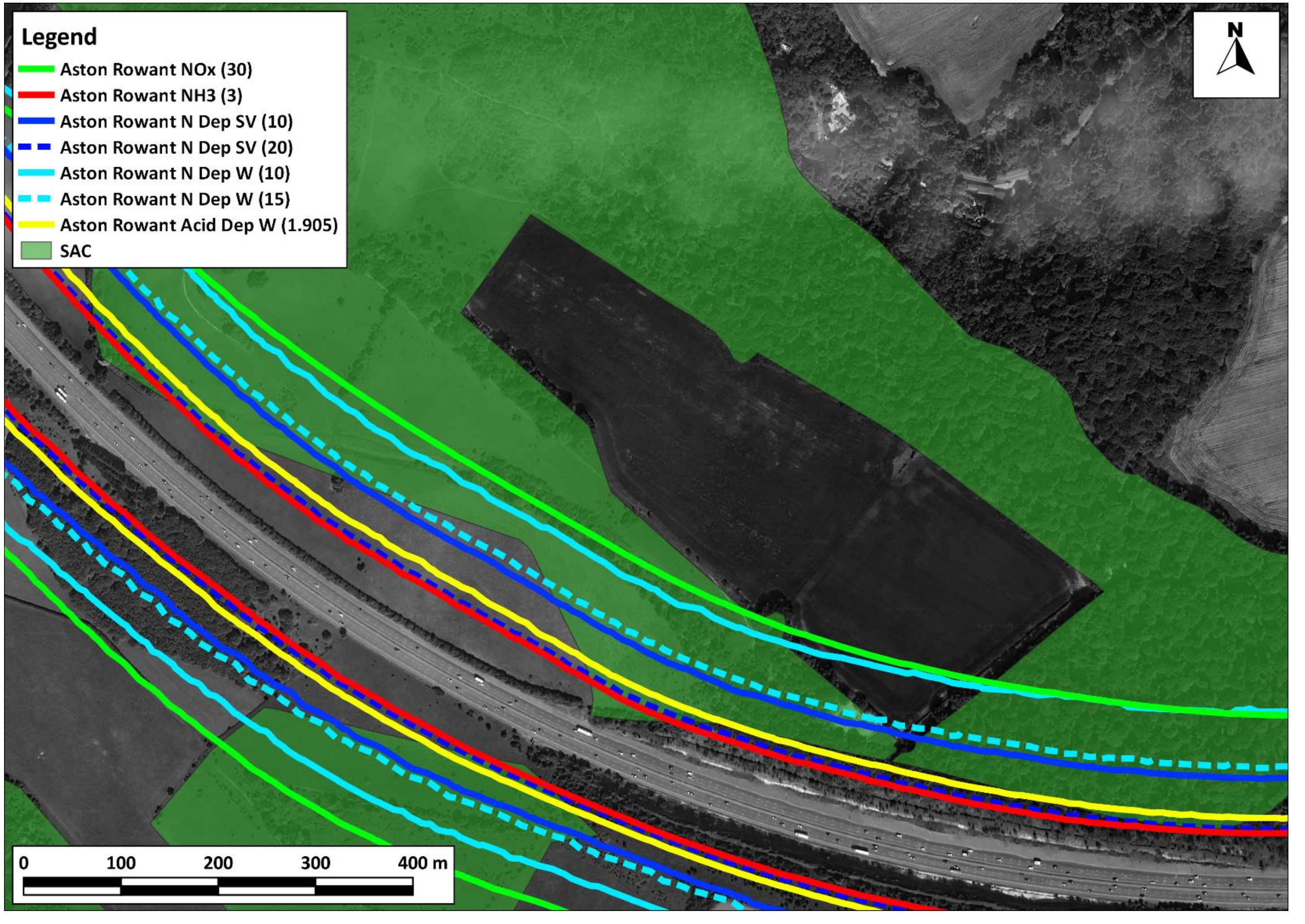

Figure 24: Areas Exceeding 1% of CLes or CLos Beside the Western Section of the M40 at Aston Rowant in 'Alone 2' (CLe and CLo value shown in parenthesis)

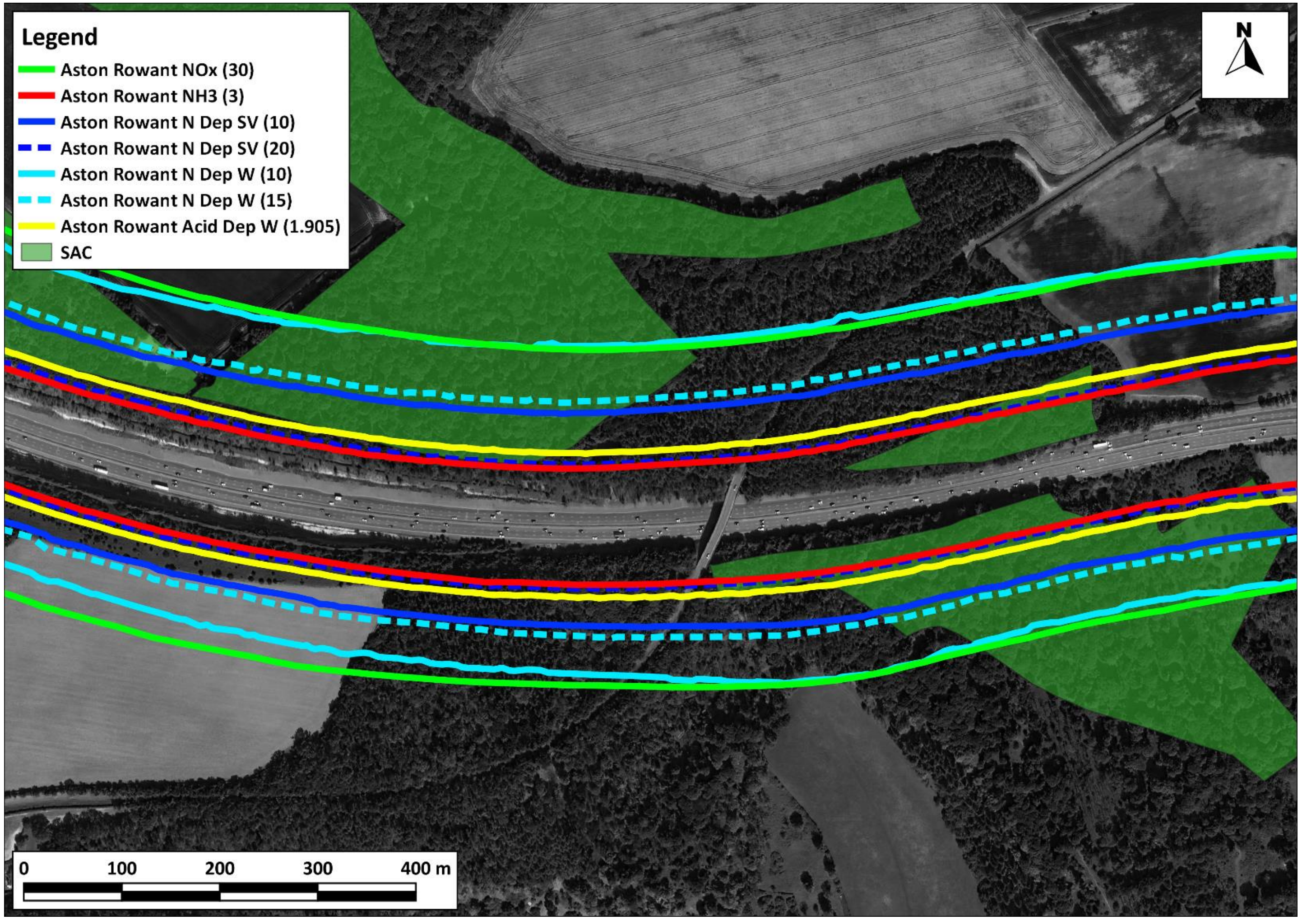

Figure 25: Areas Exceeding 1% of CLes or CLos Beside the Eastern Section of the M40 at Aston Rowant in 'Alone 2' (CLe and CLo value shown in parenthesis)

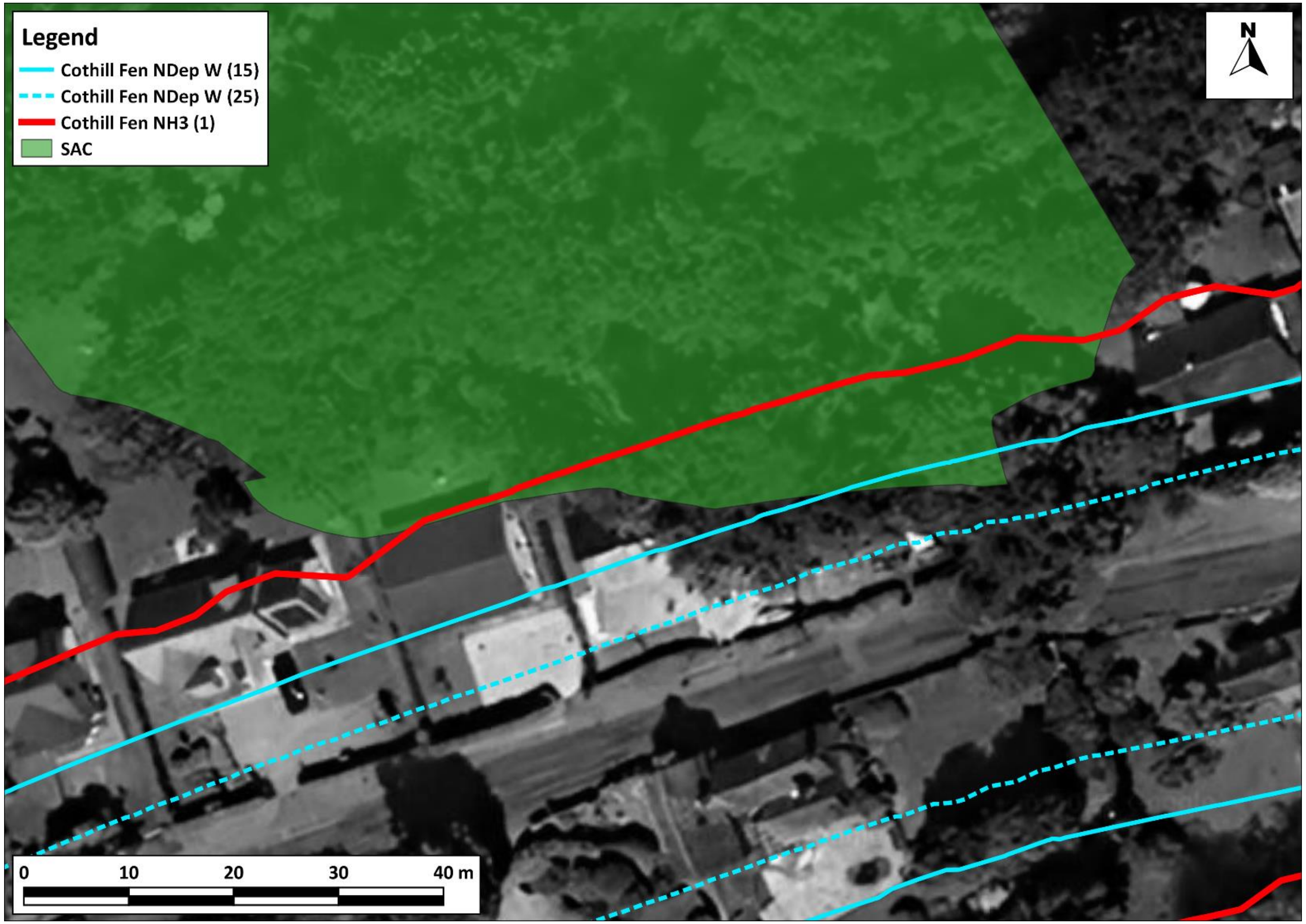

Figure 20: Areas Exceeding 1% of CLes or CLos at Cothill Fen in 'Alone 2' (CLe and CLo value shown in parenthesis)

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7 Appendices

A1 Professional Experience

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

Dr Marner is the Director of Air Quality Modelling and Assessment at AQC and has more than 20 years' relevant experience. 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 acted as expert witness at 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 developed a range of widely-used air quality models and contributed to the development of best practice. Dr Marner has provided support and advice to foreign governments, Highways England, Transport Scotland, Transport for London, Greater London Authority, the Joint Nature Conservation Committee, the Environment Agency, and numerous local authorities. He is a Member of the Institute of Air Quality Management and a Chartered Scientist. He currently advises the UK Government on air quality as part of its Air Quality Expert Group (AQEG), where his specific area of expertise relates to air quality assessment in the development control process, and has separately provided advice on air quality issues to Defra's Chief Scientific Adviser, the UK Chief Medical Officer, and the UK Chief Planner.

Penny Wilson, BSc (Hons) CSci MIEnvSc MIAQM

Ms Wilson is a Technical Director with AQC, with more than 20 years' relevant experience in the field of air quality. She has been responsible for numerous assessments for a range of infrastructure developments including power stations, road schemes, ports, airports and residential/commercial developments. The assessments have covered operational and construction impacts, including dust and odour nuisance. She also provides services to local authorities in support of their LAQM duties, including the preparation of Review and Assessment and Action Plan reports, as well as audits of Air Quality Assessments submitted with planning and DCO applications. She has provided expert evidence to a number of Public Inquiries and civil court, and is a Member of the Institute of Air Quality Management and a Chartered Scientist.

Rosie Watts, BSc (Hons) MSC

Following a degree in Physical Geography, Rosie completed a PhD studying wildfires. This was a collaborative study with industry stakeholders focusing on perceptions towards them as a risk. Rosie brings with her a background in climate change and its related risks, where throughout her academic career, she developed an interest in air quality, including in relation to wildfire events. She has since developed expertise carrying out air quality assessments for a range of clients.

A2 Modelling Methodology

Model Inputs

A2.1 Predictions have been carried out using the ADMS-Roads dispersion model (v5). The model requires the user to provide various input data, including emissions from each section of road and the road characteristics. Vehicle emissions have been calculated based on vehicle flow, composition and speed data using the EFT (Version 13.1) published by Defra (2025) and CREAM 2A, published by AQC (2025). Model input parameters are summarised in Table A2-1 and, where considered necessary, discussed further below.

Table A2-1: Summary of Model Inputs

Model Parameter	Value Used
Terrain Effects Modelled?	Yes – Each SAC modelled separately at 50m resolution
Variable Surface Roughness File Used?	Yes – Each SAC modelled separately at 50m resolution
Urban Canopy Flow Used?	No
Advanced Street Canyons Modelled?	No
Noise Barriers Modelled?	No
Meteorological Monitoring Site	RAF Benson
Meteorological Data Year	2018
Dispersion Site Surface Roughness Length (m)	N/A (variable surface roughness file used)
Dispersion Site Minimum MO Length (m)	1
Met Site Surface Roughness Length (m)	0.2
Met Site Minimum MO Length (m)	1
Gradients?	No

A2.2 The M40 at Aston Rowant is within a cutting. Cuttings cannot be modelled in ADMS-Roads. Some effect of the cutting will be simulated by the inclusion of terrain within the model, but there may still be effects which are not fully counted.

A2.3 Traffic flows and speeds for the AM peak, Interpeak, and PM peak periods, as well as the Annual Average Daily Traffic (AADT) flows, have been provided from the Oxfordshire Strategic Model (OSM). Flows during the off peak period have been calculated using the AADT and those for each of the peak periods (speeds during the off peak have been assumed to be those reported for the AADT). Traffic flows and speeds during each peak period have been modelled separately, assuming AM peak flows represent 7-10AM during weekdays, interpeak represents 10AM to 4PM on weekdays, PM peak represents 4-7PM on weekdays, and off peak represents remaining weekday hours and weekends (National Highways, 2025).

A2.4 Changes to traffic caused by the emerging Cherwell Plan were provided as AADT flows only. These changes have been spread across the OSM-derived peak flows based on the relative values in the Traffic 3 dataset. All of the traffic data used in this assessment are shown in Table A2-2, with the locations of each modelled link shown in Figure A2-1 to Figure A2-3.

Table A2-2: Traffic Data used in the Assessment

		Traffic 1						Traffic 2						Traffic 3						Traffic 4					
Link	Period	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph
44	AM	449	84	10	5	1	40	702	87	8	4	1	40	633	85	10	4	1	40	633	85	10	4	1	40
45	AM	2870	81	14	4	0	106	4001	80	15	4	0	106	4019	80	15	4	0	106	4005	80	15	4	0	106
46	AM	3837	80	13	6	0	102	4761	79	14	7	0	102	4687	79	14	7	0	102	4670	79	14	7	0	102
44	IP	231	89	6	3	2	40	367	92	4	2	1	40	294	90	6	3	1	40	294	90	6	3	1	40
45	IP	3226	76	18	5	0	105	4229	75	20	5	0	105	4205	75	20	5	0	105	4190	75	20	5	0	105
46	IP	2717	79	16	5	0	107	3869	79	16	4	0	107	3804	79	16	4	0	107	3789	79	16	4	0	107
44	PM	366	88	6	5	1	40	446	89	6	5	1	40	438	88	6	5	1	40	438	88	6	5	1	40
45	PM	4056	89	9	2	0	102	4831	87	10	2	0	102	4786	87	10	2	0	102	4768	87	10	2	0	102
46	PM	3160	87	9	3	0	105	4122	87	10	3	0	105	4096	87	10	3	0	105	4080	87	10	3	0	105
44	OP	105	88	7	4	1	40	154	90	6	3	1	40	134	88	7	4	1	40	134	88	7	4	1	40
45	OP	1169	81	15	4	0	104	1504	79	16	4	0	104	1497	79	16	4	0	104	1491	79	16	4	0	104
46	OP	1046	81	14	5	0	105	1416	81	14	4	0	105	1396	81	14	4	0	105	1391	81	14	4	0	105
29	AM	608	86	13	1	0	51	701	86	13	1	0	51	726	82	16	1	0	51	726	82	16	1	0	51
30	AM	608	86	13	1	0	51	701	86	13	1	0	51	726	82	16	1	0	51	726	82	16	1	0	51
31	AM	608	86	13	1	0	51	701	86	13	1	0	51	726	82	16	1	0	51	726	82	16	1	0	51
32	AM	492	86	14	0	0	42	603	88	12	0	0	42	603	84	16	0	0	42	603	84	16	0	0	42
33	AM	492	86	14	0	0	42	603	88	12	0	0	42	603	84	16	0	0	42	603	84	16	0	0	42
34	AM	492	86	14	0	0	42	603	88	12	0	0	42	603	84	16	0	0	42	603	84	16	0	0	42
35	AM	236	78	19	3	0	44	227	70	27	3	0	44	202	65	30	6	0	44	202	65	30	6	0	44
36	AM	236	78	19	3	0	20	227	70	27	3	0	20	202	65	30	6	0	20	202	65	30	6	0	20
37	AM	187	85	12	3	0	46	162	73	24	3	0	46	188	75	21	5	0	46	188	75	21	5	0	46
38	AM	187	85	12	3	0	46	162	73	24	3	0	46	188	75	21	5	0	46	188	75	21	5	0	46
39	AM	187	85	12	3	0	46	162	73	24	3	0	46	188	75	21	5	0	46	188	75	21	5	0	46
40	AM	430	83	10	7	0	45	834	85	11	4	0	45	814	88	8	5	0	45	814	88	8	5	0	45
41	AM	430	83	10	7	0	45	834	85	11	4	0	45	814	88	8	5	0	45	814	88	8	5	0	45
42	AM	430	83	10	7	0	45	834	85	11	4	0	45	814	88	8	5	0	45	814	88	8	5	0	45
43	AM	430	83	10	7	0	45	834	85	11	4	0	45	814	88	8	5	0	45	814	88	8	5	0	45
29	IP	413	83	15	2	0	55	421	82	16	1	0	55	431	82	17	1	0	55	431	82	17	1	0	55
30	IP	413	83	15	2	0	55	421	82	16	1	0	55	431	82	17	1	0	55	431	82	17	1	0	55
31	IP	413	83	15	2	0	55	421	82	16	1	0	55	431	82	17	1	0	55	431	82	17	1	0	55
32	IP	335	84	16	0	0	43	376	84	15	0	0	43	388	84	16	0	0	43	388	84	16	0	0	43
33	IP	335	84	16	0	0	43	376	84	15	0	0	43	388	84	16	0	0	43	388	84	16	0	0	43
34	IP	335	84	16	0	0	43	376	84	15	0	0	43	388	84	16	0	0	43	388	84	16	0	0	43
35	IP	182	79	17	4	0	44	134	65	30	5	0	44	135	67	29	5	0	44	135	67	29	5	0	44
36	IP	182	79	17	4	0	20	134	65	30	5	0	20	135	67	29	5	0	20	135	67	29	5	0	20
37	IP	131	85	12	3	0	46	99	79	18	3	0	46	99	80	17	2	0	46	99	80	17	2	0	46
38	IP	131	85	12	3	0	46	99	79	18	3	0	46	99	80	17	2	0	46	99	80	17	2	0	46
39	IP	131	85	12	3	0	46	99	79	18	3	0	46	99	80	17	2	0	46	99	80	17	2	0	46
40	IP	222	86	9	5	0	47	433	86	11	3	0	47	436	87	10	4	0	47	436	87	10	4	0	47
41	IP	222	86	9	5	0	47	433	86	11	3	0	47	436	87	10	4	0	47	436	87	10	4	0	47
42	IP	222	86	9	5	0	47	433	86	11	3	0	47	436	87	10	4	0	47	436	87	10	4	0	47
43	IP	222	86	9	5	0	47	433	86	11	3	0	47	436	87	10	4	0	47	436	87	10	4	0	47
29	PM	673	89	10	0	0	54	492	91	8	0	0	54	549	92	8	0	0	54	549	92	8	0	0	54
30	PM	673	89	10	0	0	54	492	91	8	0	0	54	549	92	8	0	0	54	549	92	8	0	0	54
31	PM	673	89	10	0	0	54	492	91	8	0	0	54	549	92	8	0	0	54	549	92	8	0	0	54
32	PM	569	89	11	0	0	43	406	93	6	0	0	43	439	93	6	0	0	43	439	93	6	0	0	43
33	PM	569	89	11	0	0	43	406	93	6	0	0	43	439	93	6	0	0	43	439	93	6	0	0	43
34	PM	569	89	11	0	0	43	406	93	6	0	0	43	439	93	6	0	0	43	439	93	6	0	0	43
35	PM	229	78	21	1	0	43	167	73	26	1	0	43	190	76	23	1	0	43	190	76	23	1	0	43
36	PM	229	78	21	1	0	20	167	73	26	1	0	20	190	76	23	1	0	20	190	76	23	1	0	20
37	PM	164	87	12	1	0	46	158	79	20	0	0	46	182	81	18	0	0	46	182	81	18	0	0	46
38	PM	164	87	12	1	0	46	158	79	20	0	0	46	182	81	18	0	0	46	182	81	18	0	0	46
39	PM	164	87	12	1	0	46	158	79	20	0	0	46	182	81	18	0	0	46	182	81	18	0	0	46
40	PM	358	87	8	5	0	47	795	89	10	1	0	47	830	89	10	1	0	47	830	89	10	1	0	47
41	PM	358	87	8	5	0	47	795	89	10	1	0	47	830	89	10	1	0	47	830	89	10	1	0	47
42	PM	358	87	8	5	0	47	795	89	10	1	0	47	830	89	10	1	0	47	830	89	10	1	0	47
43	PM	358	87	8	5	0	47	795	89	10	1	0	47	830	89	10	1	0	47	830	89	10	1	0	47
29	OP	177	86	13	1	0	53	169	85	14	1	0	53	177	85	14	1	0	53	177	85	14	1	0	53
30	OP	177	86	13	1	0	53	169	85	14	1	0	53	177	85	14	1	0	53	177	85	14	1	0	53
31	OP	177	86	13	1	0	53	169	85	14	1	0	53	177	85	14	1	0	53	177	85	14	1	0	53
32	OP	146	86	14	0	0	43	146	87	12	0	0	43	152	86	14	0	0	43	152	86	14	0	0	43
33	OP	146	86	14	0	0	43	146	87	12	0	0	43	152	86	14	0	0	43	152	86	14	0	0	43
34	OP	146	86	14	0	0	43	146	87	12	0	0	43	152	86	14	0	0	43	152	86	14	0	0	43
35	OP	70	78	19	3	0	44	55	68	28	3	0	44	55	69	27	4	0	44	55	69	27	4	0	44
36	OP	70	78	19	3	0	20	55	68	28	3	0	20	55	69	27	4	0	20	55	69	27	4	0	20
37	OP	52	86	12	2	0	46	43	78	20	2	0	46	47	79	18	2	0	46	47	79	18	2	0	46
38	OP	52	86	12	2	0	46	43	78	20	2	0	46	47	79	18	2	0	46	47	79	18	2	0	46

		Traffic 1						Traffic 2						Traffic 3						Traffic 4					
Link	Period	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph
39	OP	52	86	12	2	0	46	43	78	20	2	0	46	47	79	18	2	0	46	47	79	18	2	0	46
40	OP	101	85	9	6	0	46	205	87	10	3	0	46	207	87	9	3	0	46	207	87	9	3	0	46
41	OP	101	85	9	6	0	46	205	87	10	3	0	46	207	87	9	3	0	46	207	87	9	3	0	46
42	OP	101	85	9	6	0	46	205	87	10	3	0	46	207	87	9	3	0	46	207	87	9	3	0	46
43	OP	101	85	9	6	0	46	205	87	10	3	0	46	207	87	9	3	0	46	207	87	9	3	0	46
1	AM	1384	78	13	9	0	59	2268	81	12	6	1	59	2263	81	12	6	1	59	2232	81	12	7	1	59
2	AM	1384	78	13	9	0	59	2268	81	12	6	1	59	2263	81	12	6	1	59	2232	81	12	7	1	59
3	AM	1384	78	13	9	0	59	2268	81	12	6	1	59	2263	81	12	6	1	59	2232	81	12	7	1	59
4	AM	1384	78	13	9	0	59	2268	81	12	6	1	59	2263	81	12	6	1	59	2232	81	12	7	1	59
5	AM	3068	79	15	7	0	84	3676	82	12	6	0	84	3692	82	12	6	0	84	3673	82	12	5	0	84
6	AM	3145	80	14	6	0	83	3849	82	13	5	0	83	3857	82	13	5	0	83	3838	82	13	5	0	83
7	AM	3145	80	14	6	0	83	3849	82	13	5	0	83	3857	82	13	5	0	83	3838	82	13	5	0	83
8	AM	3068	79	15	7	0	84	3676	82	12	6	0	84	3692	82	12	6	0	84	3673	82	12	5	0	84
9	AM	3068	79	15	7	0	84	3676	82	12	6	0	84	3692	82	12	6	0	84	3673	82	12	5	0	84
10	AM	3068	79	15	7	0	84	3676	82	12	6	0	84	3692	82	12	6	0	84	3673	82	12	5	0	84
11	AM	3068	79	15	7	0	84	3676	82	12	6	0	84	3692	82	12	6	0	84	3673	82	12	5	0	84
12	AM	3145	80	14	6	0	83	3849	82	13	5	0	83	3857	82	13	5	0	83	3838	82	13	5	0	83
13	AM	3145	80	14	6	0	83	3849	82	13	5	0	83	3857	82	13	5	0	83	3838	82	13	5	0	83
14	AM	3145	80	14	6	0	83	3849	82	13	5	0	83	3857	82	13	5	0	83	3838	82	13	5	0	83
15	AM	3145	80	14	6	0	83	3849	82	13	5	0	83	3857	82	13	5	0	83	3838	82	13	5	0	83
16	AM	19	57	27	17	0	47	46	56	29	15	0	47	47	60	27	13	0	47	47	60	27	13	0	47
17	AM	19	57	27	17	0	47	46	56	29	15	0	47	47	60	27	13	0	47	47	60	27	13	0	47
18	AM	19	57	27	17	0	47	46	56	29	15	0	47	47	60	27	13	0	47	47	60	27	13	0	47
19	AM	19	57	27	17	0	47	46	56	29	15	0	47	47	60	27	13	0	47	47	60	27	13	0	47
20	AM	59	72	21	1	7	40	56	74	18	1	7	40	65	83	10	0	6	40	65	83	10	0	6	40
21	AM	59	72	21	1	7	40	56	74	18	1	7	40	65	83	10	0	6	40	65	83	10	0	6	40
22	AM	248	93	5	1	2	35	493	94	5	1	1	35	484	93	5	1	1	35	484	93	5	1	1	35
23	AM	255	90	5	2	3	40	513	91	6	2	1	40	505	90	7	2	2	40	505	90	7	2	2	40
24	AM	255	90	5	2	3	40	513	91	6	2	1	40	505	90	7	2	2	40	505	90	7	2	2	40
25	AM	255	90	5	2	3	40	513	91	6	2	1	40	505	90	7	2	2	40	505	90	7	2	2	40
26	AM	255	90	5	2	3	40	513	91	6	2	1	40	505	90	7	2	2	40	505	90	7	2	2	40
27	AM	7	0	0	44	56	40	21	15	37	31	17	40	23	28	30	26	16	40	23	28	30	26	16	40
28	AM	255	90	5	2	3	29	513	91	6	2	1	29	505	90	7	2	2	29	505	90	7	2	2	29
60	AM	19	57	27	17	0	47	46	56	29	15	0	47	47	60	27	13	0	47	47	60	27	13	0	47
61	AM	19	57	27	17	0	47	46	56	29	15	0	47	47	60	27	13	0	47	47	60	27	13	0	47
1	IP	1452	74	17	8	1	58	2116	78	14	7	1	58	2115	78	14	7	1	58	2087	77	14	7	1	58
2	IP	1452	74	17	8	1	58	2116	78	14	7	1	58	2115	78	14	7	1	58	2087	77	14	7	1	58
3	IP	1452	74	17	8	1	58	2116	78	14	7	1	58	2115	78	14	7	1	58	2087	77	14	7	1	58
4	IP	1452	74	17	8	1	58	2116	78	14	7	1	58	2115	78	14	7	1	58	2087	77	14	7	1	58
5	IP	2684	75	18	8	0	88	3652	80	14	6	0	88	3654	80	14	6	0	88	3635	80	14	6	0	88
6	IP	2422	75	18	7	0	91	3589	80	14	5	0	91	3572	80	14	5	0	91	3554	80	14	5	0	91
7	IP	2422	75	18	7	0	91	3589	80	14	5	0	91	3572	80	14	5	0	91	3554	80	14	5	0	91
8	IP	2684	75	18	8	0	88	3652	80	14	6	0	88	3654	80	14	6	0	88	3635	80	14	6	0	88
9	IP	2684	75	18	8	0	88	3652	80	14	6	0	88	3654	80	14	6	0	88	3635	80	14	6	0	88
10	IP	2684	75	18	8	0	88	3652	80	14	6	0	88	3654	80	14	6	0	88	3635	80	14	6	0	88
11	IP	2684	75	18	8	0	88	3652	80	14	6	0	88	3654	80	14	6	0	88	3635	80	14	6	0	88
12	IP	2422	75	18	7	0	91	3589	80	14	5	0	91	3572	80	14	5	0	91	3554	80	14	5	0	91
13	IP	2422	75	18	7	0	91	3589	80	14	5	0	91	3572	80	14	5	0	91	3554	80	14	5	0	91
14	IP	2422	75	18	7	0	91	3589	80	14	5	0	91	3572	80	14	5	0	91	3554	80	14	5	0	91
15	IP	2422	75	18	7	0	91	3589	80	14	5	0	91	3572	80	14	5	0	91	3554	80	14	5	0	91
16	IP	38	49	49	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47
17	IP	38	49	49	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47
18	IP	38	49	49	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47
19	IP	38	49	49	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47
20	IP	60	48	45	1	7	40	75	51	44	0	5	40	76	51	44	0	5	40	76	51	44	0	5	40
21	IP	60	48	45	1	7	40	75	51	44	0	5	40	76	51	44	0	5	40	76	51	44	0	5	40
22	IP	219	77	20	1	2	35	395	82	16	1	1	35	394	82	16	1	1	35	394	82	16	1	1	35
23	IP	224	76	19	1	4	40	400	81	16	1	2	40	400	81	16	1	2	40	400	81	16	1	2	40
24	IP	224	76	19	1	4	40	400	81	16	1	2	40	400	81	16	1	2	40	400	81	16	1	2	40
25	IP	224	76	19	1	4	40	400	81	16	1	2	40	400	81	16	1	2	40	400	81	16	1	2	40
26	IP	224	76	19	1	4	40	400	81	16	1	2	40	400	81	16	1	2	40	400	81	16	1	2	40
27	IP	4	0	0	10	89	40	6	12	5	11	71	40	6	13	6	11	70	40	6	13	6	11	70	40
28	IP	224	76	19	1	4	29	400	81	16	1	2	29	400	81	16	1	2	29	400	81	16	1	2	29
60	IP	38	49	49	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47
61	IP	38	49	49	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47	55	54	45	1	0	47
1	PM	1338	86	11	2	0	60	2309	88	9	2	1	60	2306	88	9	2	1	60	2272	88	9	2	1	60
2	PM	1338	86	11	2	0	60	2309	88	9	2	1	60	2306	88	9	2	1	60	2272	88	9	2	1	60
3	PM	1338	86	11	2	0	60	2309	88	9	2	1	60	2306	88	9	2	1	60	2272	88	9	2	1	60
4	PM	1338	86	11	2	0	60	2309	88	9	2	1	60	2306	88	9	2	1	60	2272	88	9	2	1	60

		Traffic 1						Traffic 2						Traffic 3						Traffic 4					
Link	Period	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph
5	PM	3677	90	8	2	0	78	3875	90	8	2	0	78	3875	90	8	2	0	78	3860	91	8	2	0	78
6	PM	3179	88	10	2	0	85	3971	91	8	2	0	85	3955	91	8	2	0	85	3939	91	8	2	0	85
7	PM	3179	88	10	2	0	85	3971	91	8	2	0	85	3955	91	8	2	0	85	3939	91	8	2	0	85
8	PM	3677	90	8	2	0	78	3875	90	8	2	0	78	3875	90	8	2	0	78	3860	91	8	2	0	78
9	PM	3677	90	8	2	0	78	3875	90	8	2	0	78	3875	90	8	2	0	78	3860	91	8	2	0	78
10	PM	3677	90	8	2	0	78	3875	90	8	2	0	78	3875	90	8	2	0	78	3860	91	8	2	0	78
11	PM	3677	90	8	2	0	78	3875	90	8	2	0	78	3875	90	8	2	0	78	3860	91	8	2	0	78
12	PM	3179	88	10	2	0	85	3971	91	8	2	0	85	3955	91	8	2	0	85	3939	91	8	2	0	85
13	PM	3179	88	10	2	0	85	3971	91	8	2	0	85	3955	91	8	2	0	85	3939	91	8	2	0	85
14	PM	3179	88	10	2	0	85	3971	91	8	2	0	85	3955	91	8	2	0	85	3939	91	8	2	0	85
15	PM	3179	88	10	2	0	85	3971	91	8	2	0	85	3955	91	8	2	0	85	3939	91	8	2	0	85
16	PM	40	69	24	6	0	47	46	74	26	0	0	47	46	74	26	0	0	47	46	74	26	0	0	47
17	PM	40	69	24	6	0	47	46	74	26	0	0	47	46	74	26	0	0	47	46	74	26	0	0	47
18	PM	40	69	24	6	0	47	46	74	26	0	0	47	46	74	26	0	0	47	46	74	26	0	0	47
19	PM	40	69	24	6	0	47	46	74	26	0	0	47	46	74	26	0	0	47	46	74	26	0	0	47
20	PM	44	67	23	1	9	40	82	79	16	0	5	40	79	78	17	0	5	40	79	78	17	0	5	40
21	PM	44	67	23	1	9	40	82	79	16	0	5	40	79	78	17	0	5	40	79	78	17	0	5	40
22	PM	167	90	7	0	2	35	348	94	5	0	1	35	348	94	5	0	1	35	348	94	5	0	1	35
23	PM	174	87	7	2	5	40	352	93	5	0	2	40	352	93	5	0	2	40	352	93	5	0	2	40
24	PM	174	87	7	2	5	40	352	93	5	0	2	40	352	93	5	0	2	40	352	93	5	0	2	40
25	PM	174	87	7	2	5	40	352	93	5	0	2	40	352	93	5	0	2	40	352	93	5	0	2	40
26	PM	174	87	7	2	5	40	352	93	5	0	2	40	352	93	5	0	2	40	352	93	5	0	2	40
27	PM	7	1	0	38	61	40	4	0	0	0	100	40	4	1	0	0	99	40	4	1	0	0	99	40
28	PM	174	87	7	2	5	29	352	93	5	0	2	29	352	93	5	0	2	29	352	93	5	0	2	29
60	PM	40	69	24	6	0	47	46	74	26	0	0	47	46	74	26	0	0	47	46	74	26	0	0	47
61	PM	40	69	24	6	0	47	46	74	26	0	0	47	46	74	26	0	0	47	46	74	26	0	0	47
1	OP	490	77	15	7	0	59	759	81	12	5	1	59	759	81	12	5	1	59	748	81	12	6	1	59
2	OP	490	77	15	7	0	59	759	81	12	5	1	59	759	81	12	5	1	59	748	81	12	6	1	59
3	OP	490	77	15	7	0	59	759	81	12	5	1	59	759	81	12	5	1	59	748	81	12	6	1	59
4	OP	490	77	15	7	0	59	759	81	12	5	1	59	759	81	12	5	1	59	748	81	12	6	1	59
5	OP	1038	80	14	6	0	84	1287	83	12	5	0	84	1288	83	12	5	0	84	1282	83	12	5	0	84
6	OP	947	80	15	6	0	87	1293	83	12	4	0	87	1288	83	12	4	0	87	1282	83	12	4	0	87
7	OP	947	80	15	6	0	87	1293	83	12	4	0	87	1288	83	12	4	0	87	1282	83	12	4	0	87
8	OP	1038	80	14	6	0	84	1287	83	12	5	0	84	1288	83	12	5	0	84	1282	83	12	5	0	84
9	OP	1038	80	14	6	0	84	1287	83	12	5	0	84	1288	83	12	5	0	84	1282	83	12	5	0	84
10	OP	1038	80	14	6	0	84	1287	83	12	5	0	84	1288	83	12	5	0	84	1282	83	12	5	0	84
11	OP	1038	80	14	6	0	84	1287	83	12	5	0	84	1288	83	12	5	0	84	1282	83	12	5	0	84
12	OP	947	80	15	6	0	87	1293	83	12	4	0	87	1288	83	12	4	0	87	1282	83	12	4	0	87
13	OP	947	80	15	6	0	87	1293	83	12	4	0	87	1288	83	12	4	0	87	1282	83	12	4	0	87
14	OP	947	80	15	6	0	87	1293	83	12	4	0	87	1288	83	12	4	0	87	1282	83	12	4	0	87
15	OP	947	80	15	6	0	87	1293	83	12	4	0	87	1288	83	12	4	0	87	1282	83	12	4	0	87
16	OP	12	55	40	4	0	47	18	59	38	3	0	47	18	59	38	3	0	47	18	59	38	3	0	47
17	OP	12	55	40	4	0	47	18	59	38	3	0	47	18	59	38	3	0	47	18	59	38	3	0	47
18	OP	12	55	40	4	0	47	18	59	38	3	0	47	18	59	38	3	0	47	18	59	38	3	0	47
19	OP	12	55	40	4	0	47	18	59	38	3	0	47	18	59	38	3	0	47	18	59	38	3	0	47
20	OP	19	56	36	1	7	40	26	61	33	0	5	40	26	63	32	0	5	40	26	63	32	0	5	40
21	OP	19	56	36	1	7	40	26	61	33	0	5	40	26	63	32	0	5	40	26	63	32	0	5	40
22	OP	73	83	14	1	2	35	139	87	11	1	1	35	138	87	11	1	1	35	138	87	11	1	1	35
23	OP	75	81	14	2	4	40	141	86	11	1	2	40	141	86	11	1	2	40	141	86	11	1	2	40
24	OP	75	81	14	2	4	40	141	86	11	1	2	40	141	86	11	1	2	40	141	86	11	1	2	40
25	OP	75	81	14	2	4	40	141	86	11	1	2	40	141	86	11	1	2	40	141	86	11	1	2	40
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27	OP	2	0	0	26	73	40	3	12	19	19	50	40	3	19	17	17	48	40	3	19	17	17	48	40
28	OP	75	81	14	2	4	29	141	86	11	1	2	29	141	86	11	1	2	29	141	86	11	1	2	29
60	OP	12	55	40	4	0	47	18	59	38	3	0	47	18	59	38	3	0	47	18	59	38	3	0	47
61	OP	12	55	40	4	0	47	18	59	38	3	0	47	18	59	38	3	0	47	18	59	38	3	0	47
47	AM	2772	83	12	5	0	69	3336	84	12	5	0	69	3316	83	12	5	0	69	3316	83	12	5	0	69
48	AM	2766	83	12	5	0	69	3317	83	12	5	0	69	3297	83	12	5	0	69	3297	83	12	5	0	69
49	AM	2766	83	12	5	0	69	3317	83	12	5	0	69	3297	83	12	5	0	69	3297	83	12	5	0	69
50	AM	2766	83	12	5	0	69	3317	83	12	5	0	69	3297	83	12	5	0	69	3297	83	12	5	0	69
51	AM	2929	81	14	5	0	68	3698	83	12	5	0	68	3705	82	13	5	0	68	3705	82	13	5	0	68
52	AM	400	81	12	6	1	40	580	82	14	3	1	40	550	82	14	3	1	40	550	82	14	3	1	40
53	AM	400	81	12	6	1	40	580	82	14	3	1	40	550	82	14	3	1	40	550	82	14	3	1	40
54	AM	400	81	12	6	1	40	580	82	14	3	1	40	550	82	14	3	1	40	550	82	14	3	1	40
55	AM	574	84	11	4	1	50	748	84	13	3	1	50	713	83	13	2	1	50	713	83	13	2	1	50
56	AM	174	91	9	0	0	40	306	90	9	1	0	40	303	90	9	1	0	40	303	90	9	1	0	40
59	AM	174	91	9	0	0	20	306	90	9	1	0	20	303	90	9	1	0	20	303	90	9	1	0	20
47	IP	1976	77	17	6	0	74	3013	82	13	4	0	74	2995	82	13	4	0	74	2995	82	13	4	0	74
48	IP	1955	77	17	6	0	74	3006	82	13	4	0	74	2988	82	13	4	0	74	2988	82	13	4	0	74

		Traffic 1						Traffic 2						Traffic 3						Traffic 4					
Link	Period	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph	Veh/h	% Car	% LGV	% HGV	% Bus	kph
49	IP	1955	77	17	6	0	74	3006	82	13	4	0	74	2988	82	13	4	0	74	2988	82	13	4	0	74
50	IP	1955	77	17	6	0	74	3006	82	13	4	0	74	2988	82	13	4	0	74	2988	82	13	4	0	74
51	IP	2144	75	18	7	0	73	3656	81	14	5	0	73	3692	82	14	5	0	73	3692	82	14	5	0	73
52	IP	308	70	28	1	1	40	850	79	20	1	0	40	847	78	20	1	0	40	847	78	20	1	0	40
53	IP	308	70	28	1	1	40	850	79	20	1	0	40	847	78	20	1	0	40	847	78	20	1	0	40
54	IP	308	70	28	1	1	40	850	79	20	1	0	40	847	78	20	1	0	40	847	78	20	1	0	40
55	IP	411	75	23	1	1	50	832	78	20	1	0	50	826	78	20	1	0	50	826	78	20	1	0	50
56	IP	103	90	9	1	0	40	289	91	8	1	0	40	288	91	8	1	0	40	288	91	8	1	0	40
59	IP	103	90	9	1	0	20	289	91	8	1	0	20	288	91	8	1	0	20	288	91	8	1	0	20
47	PM	2733	89	9	2	0	70	3299	91	7	1	0	70	3286	91	7	1	0	70	3286	91	7	1	0	70
48	PM	2746	89	9	2	0	70	3231	91	7	1	0	70	3220	91	8	1	0	70	3220	91	8	1	0	70
49	PM	2746	89	9	2	0	70	3231	91	7	1	0	70	3220	91	8	1	0	70	3220	91	8	1	0	70
50	PM	2746	89	9	2	0	70	3231	91	7	1	0	70	3220	91	8	1	0	70	3220	91	8	1	0	70
51	PM	3149	90	8	2	0	68	3859	91	7	1	0	68	3861	91	7	1	0	68	3861	91	7	1	0	68
52	PM	423	91	8	0	1	40	1058	90	8	1	0	40	1051	90	8	1	0	40	1051	90	8	1	0	40
53	PM	423	91	8	0	1	40	1058	90	8	1	0	40	1051	90	8	1	0	40	1051	90	8	1	0	40
54	PM	423	91	8	0	1	40	1058	90	8	1	0	40	1051	90	8	1	0	40	1051	90	8	1	0	40
55	PM	593	92	7	0	1	50	1233	90	8	1	0	50	1228	90	8	1	0	50	1228	90	8	1	0	50
56	PM	171	94	6	0	0	40	462	93	6	1	0	40	462	93	6	1	0	40	462	93	6	1	0	40
59	PM	171	94	6	0	0	20	462	93	6	1	0	20	462	93	6	1	0	20	462	93	6	1	0	20
47	OP	797	82	13	5	0	72	1088	85	12	4	0	72	1083	85	12	4	0	72	1083	85	12	4	0	72
48	OP	794	82	14	5	0	72	1080	85	12	4	0	72	1074	85	12	4	0	72	1074	85	12	4	0	72
49	OP	794	82	14	5	0	72	1080	85	12	4	0	72	1074	85	12	4	0	72	1074	85	12	4	0	72
50	OP	794	82	14	5	0	72	1080	85	12	4	0	72	1074	85	12	4	0	72	1074	85	12	4	0	72
51	OP	876	81	14	5	0	70	1288	84	12	4	0	70	1295	84	12	4	0	70	1295	84	12	4	0	70
52	OP	122	78	19	2	1	40	296	83	16	1	0	40	293	82	16	1	0	40	293	82	16	1	0	40
53	OP	122	78	19	2	1	40	296	83	16	1	0	40	293	82	16	1	0	40	293	82	16	1	0	40
54	OP	122	78	19	2	1	40	296	83	16	1	0	40	293	82	16	1	0	40	293	82	16	1	0	40
55	OP	168	82	16	1	1	50	318	83	15	1	0	50	314	83	15	1	0	50	314	83	15	1	0	50
56	OP	46	91	8	1	0	40	116	92	8	1	0	40	116	92	8	1	0	40	116	92	8	1	0	40
59	OP	46	91	8	1	0	20	116	92	8	1	0	20	116	92	8	1	0	20	116	92	8	1	0	20
57	AM	3711	80	13	6	0	103	4381	78	15	7	0	103	4361	78	15	7	0	103	4361	78	15	7	0	103
58	AM	2885	81	14	4	0	106	4066	80	15	4	0	106	4163	81	15	4	0	106	4163	81	15	4	0	106
57	IP	2665	78	16	5	0	107	3839	79	17	4	0	107	3838	79	17	4	0	107	3838	79	17	4	0	107
58	IP	3183	76	18	5	0	105	4025	75	20	5	0	105	4071	75	20	5	0	105	4071	75	20	5	0	105
57	PM	3195	88	9	2	0	105	4198	87	10	2	0	105	4182	87	10	2	0	105	4182	87	10	2	0	105
58	PM	3784	88	9	2	0	103	4392	86	11	2	0	103	4429	87	11	2	0	103	4429	87	11	2	0	103
57	OP	1031	81	14	5	0	105	1394	81	15	4	0	105	1391	81	15	4	0	105	1391	81	15	4	0	105
58	OP	1137	81	15	4	0	105	1430	79	17	4	0	105	1448	79	17	4	0	105	1448	79	17	4	0	105

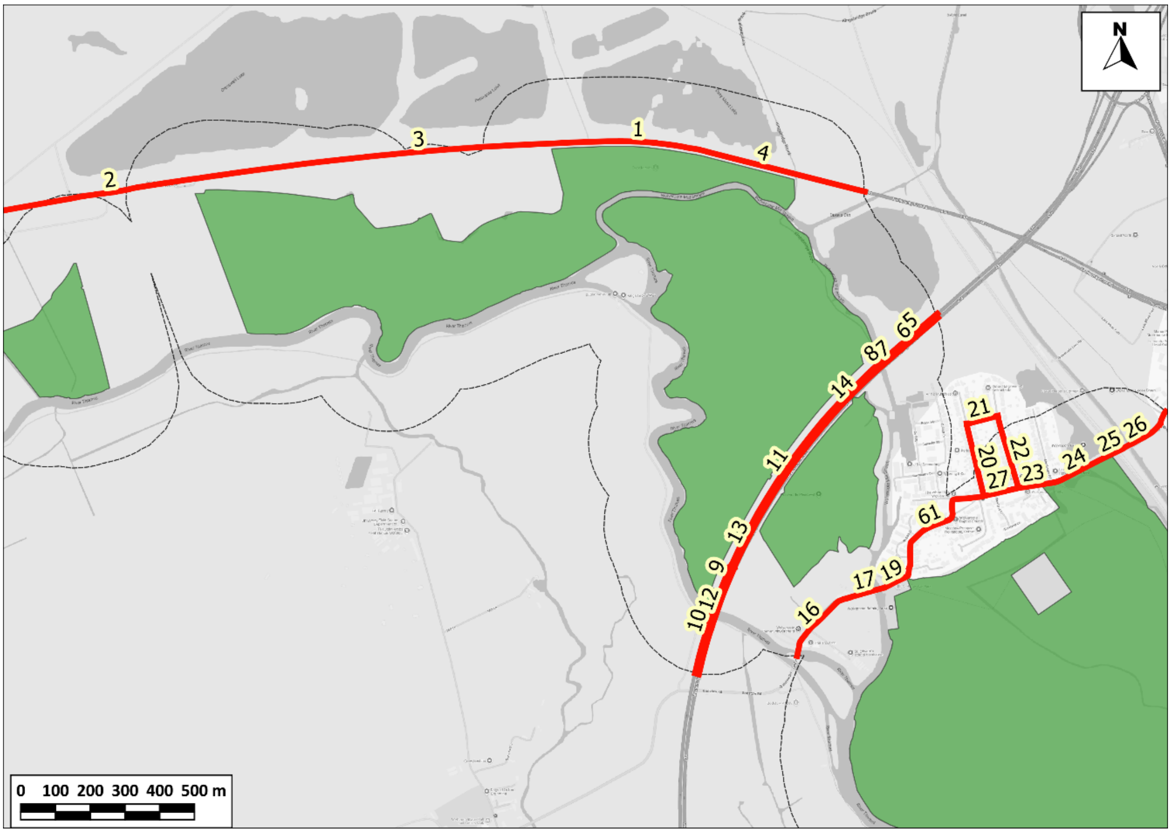

Figure A2-1: Modelled Road Network at Oxford Meadows (Numbers relate to Table A2-2. Dashed line shows 200m zone around SAC)

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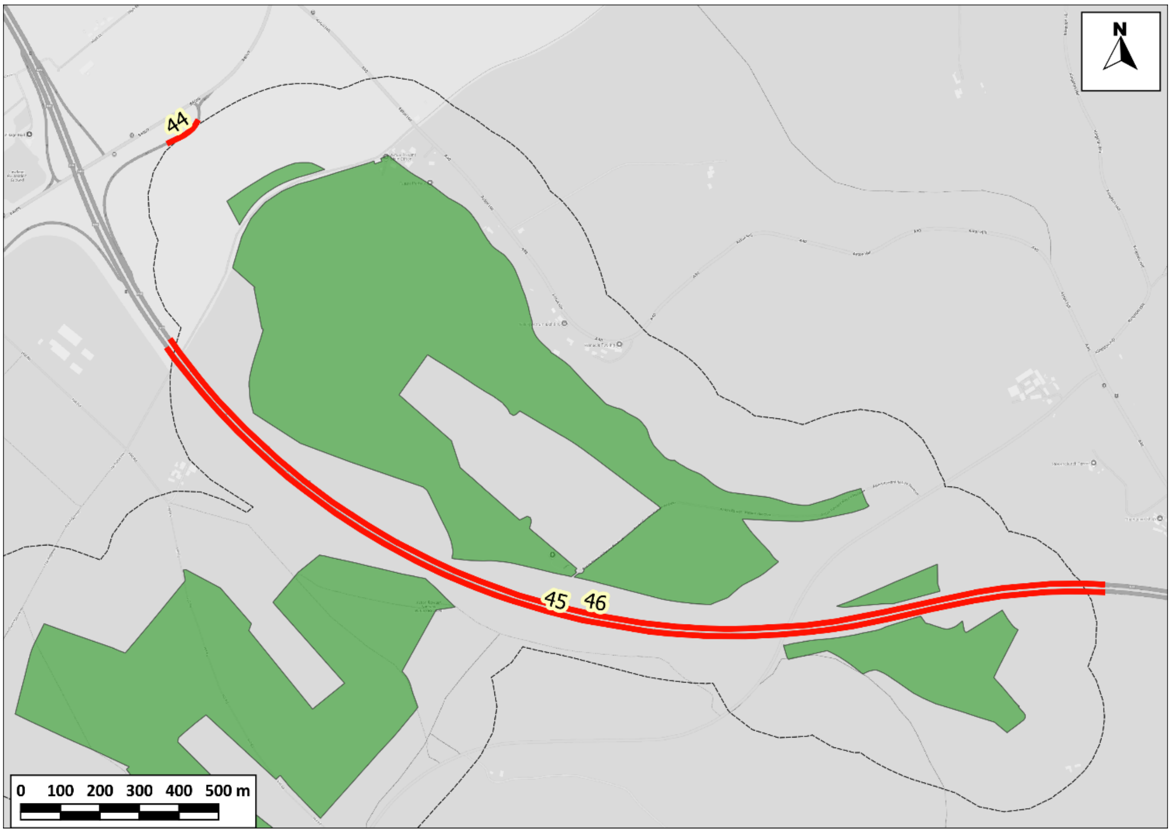

Figure A2-2: Modelled Road Network at Aston Rowant (Numbers relate to Table A2-2. Dashed line shows 200m zone around SAC)

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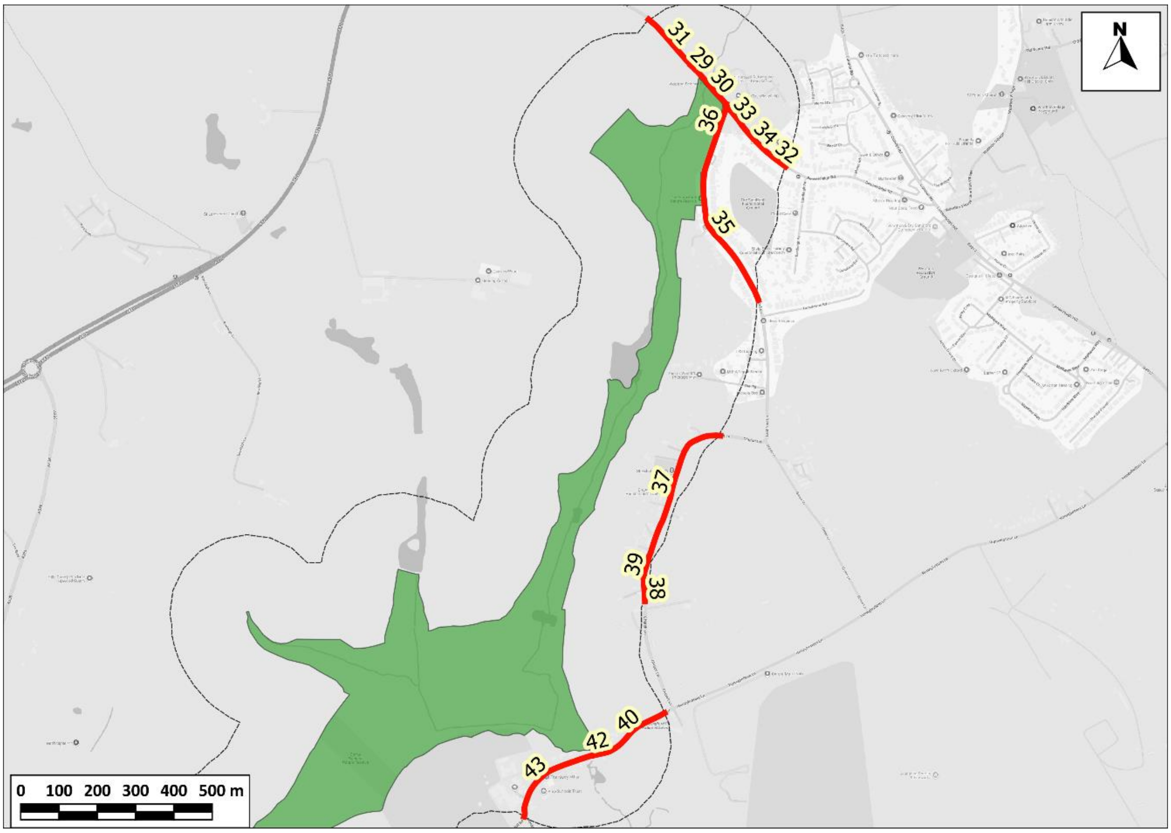

Figure A2-3: Modelled Road Network at Cothill Fen (Numbers relate to Table A2-2. Dashed line shows 200m zone around SAC)

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A2.5 Hourly sequential meteorological data in sectors of 10 degrees from RAF Benson for 2018 have been used in the model. The Benson meteorological monitoring station is located approximately 20 km from Oxford Meadows, 10 km from Aston Rowant, and 18 km from Cothill Fen. Measurements from this site provide the most appropriate meteorological data to use in this study. The station is operated by the UK Met Office, who provided the data used here. For model verification, meteorological data measured during 2021 and 2023 were also used. Wind roses summarising the data from each year are shown in Figure A2-4 to Figure A2-6.

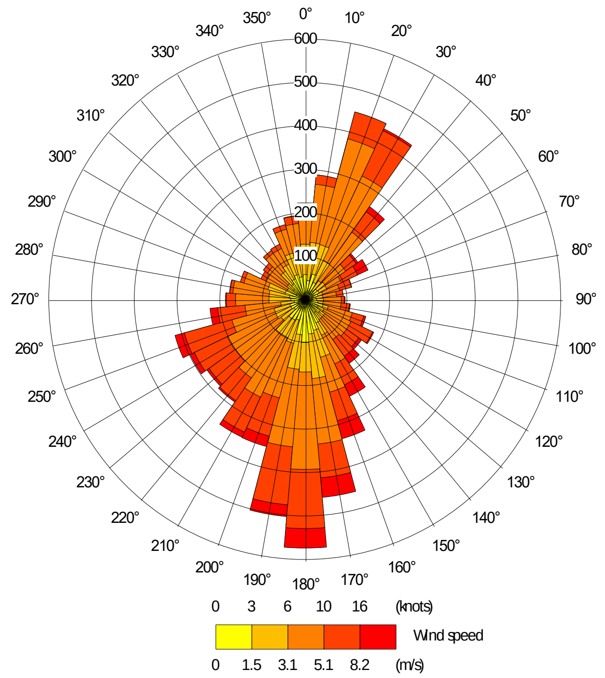

Figure A2-4: Wind Rose for the RAF Benson site in 2018

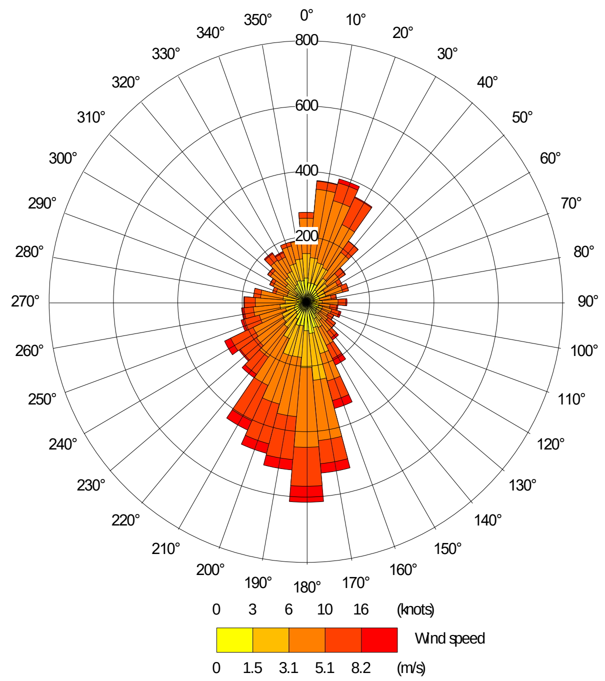

Figure A2-5: Wind Rose for the RAF Benson site in 2021

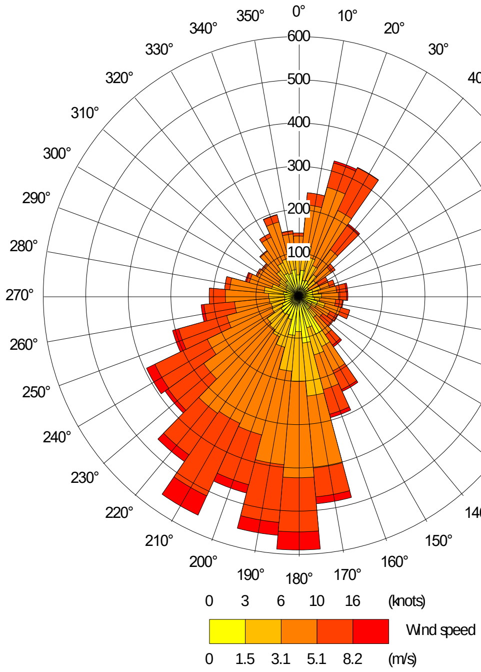

Figure A2-6: Wind Rose for the RAF Benson site in 2023

Model Verification

NOx and NO_2

A2.6 Evidence collected over many years has shown that, in most urban areas, dispersion modelling relying upon Defra's EFT has tended to systematically under-predict roadside nitrogen dioxide and nitrogen oxides concentrations. To account for this, it is necessary to adjust the model against local measurements. The focus of the current assessment is on emissions from the A40, M40, and A34. The model verification has therefore focused on measurements made alongside these roads. South and Vale Councils have, together, operated a network of monitoring sites using passive diffusion tubes including several sites alongside the A34 and M40 for many years. More recently, National Highways has also begun diffusion tube monitoring beside the A34. The locations of these monitoring sites are shown in Figure A2-1 and Figure A2-2. The annual mean measured concentrations are set out in Table A2-1.

A2.7 The A34 monitors are all in Botley, which is approximately 4 km south from the section of the A34 running through Oxford Meadows. Botley is characterised by buildings and noise barriers built close to the road, which will inhibit dispersion. This inhibition has not been included explicitly within the dispersion model used for verification, which ensures a worst-case assessment for receptors within the SACs.

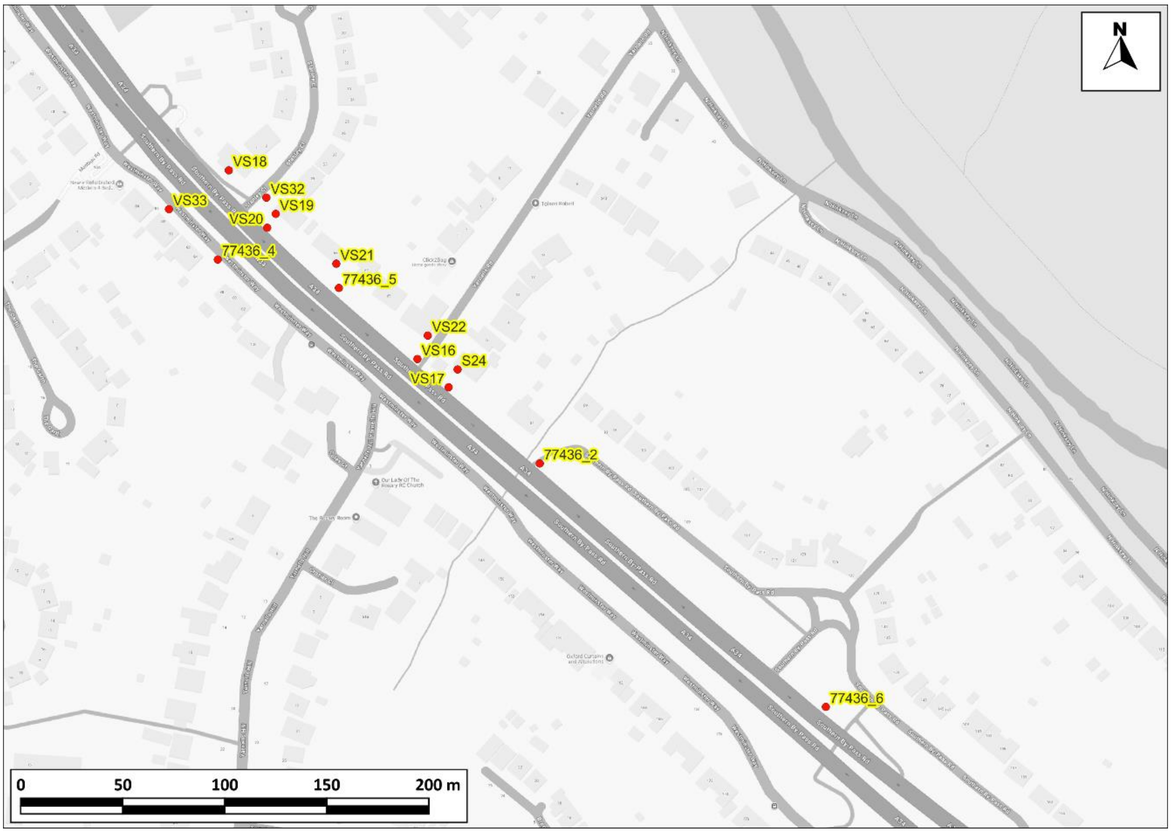

Figure A2-1: Monitoring Sites Beside the A34

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

Figure A2-2: Monitoring Site Beside the M40

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

Table A2-1: NO_2 Diffusion Tube Monitoring (Measured Annual Mean NO_2 in µg/m^3)

Operator	Site Code	2018	2021	2023
South and Vale Councils [a]	VS16	-	-	36.2
	S24	38.2	23.1	-
	VS17	87.5	55.1	49.5
	VS18	37.9	24.7	22.2
	VS19	34.7	22.6	22.1
	VS20	76.5	48.3	45.6
	VS21	34.2	22.2	19.9
	VS22	35.5	21.7	21.7
	VS32	46.2	29.4	29.8
	VS33	38.5	22.4	23.0
	SS20/22	32.2	21.9	18.3
National Highways [b]	77436_4	-	-	21.0
	77436_5	-	-	44.3
	77436_2	-	-	47.7
	77436_6*	-	-	30.4

[a] Diffusion tubes prepared and analysed by Socotec using a combination of 50% acetone and 80% water methods. Results adjusted for bias by the Councils using locally-derived factors and annualised where appropriate following Defra guidance (Defra, 2025). The data have been submitted to and approved by Defra and are published by South and Vale Councils (2024a), (2023). When carrying out the model verification, the reported locations and labelling of some tubes were found to be incorrect. Through discussion with the Council and finding each monitoring site, the correct values were used in this study.

[b] Diffusion tubes prepared and analysed by Staffordshire Scientific Services using the 80% water method. Data adjusted for bias using national-derived factors by National Highways and factors and annualised where appropriate following Defra guidance (Defra, 2025). Data are published by National Highways (National Highways, 2025).

A2.8 The model has initially been run to predict annual mean nitrogen dioxide concentrations during 2018 at the monitoring sites in Table A2-1 with relevant data in 2018. The following sites were excluded because their inclusion would have rendered the verification less robust:

- VS32 – closer to Stanley Close than to the A34. Stanley Close is not included in the traffic model;
- VS17 and VS20 – both affixed to noise barrier approximately 2m from edge of road. These locations will be significantly affected by turbulence induced by passing vehicles which is not relevant to the predictions within the SACs, all of which are much further from main roads.

A2.9 The background annual mean NO_2 concentrations used in the model verification were taken from the national maps provided by Defra for Local Air Quality Management (Defra, 2025).

A2.10 Most NO_2 is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NOx = NO + NO_2).

A2.11 The model output of road-NOx (i.e. the component of total NOx coming from road traffic) has been compared with the 'measured' road-NOx. Measured road-NOx has been calculated from the measured NO_2 concentrations and the predicted background NO_2 concentration using the NOx from NO_2 calculator (Version 9.1) available on the Defra LAQM Support website (Defra, 2025).

A2.12 The unadjusted model has under predicted the road-NOx contribution; this is a common experience with this and most other road traffic emissions dispersion models. An adjustment factor has been determined as the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution, forced through zero (Figure A2-3). The calculated adjustment factor of 1.574 has been applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations.

A2.13 The total nitrogen dioxide concentrations have then been determined by combining the adjusted modelled road-NOx concentrations with the predicted background NO_2 concentration within the NOx to NO_2 calculator. Figure A2-4 compares final adjusted modelled total NO_2 at each of the monitoring sites to measured total NO_2, and shows a close agreement.

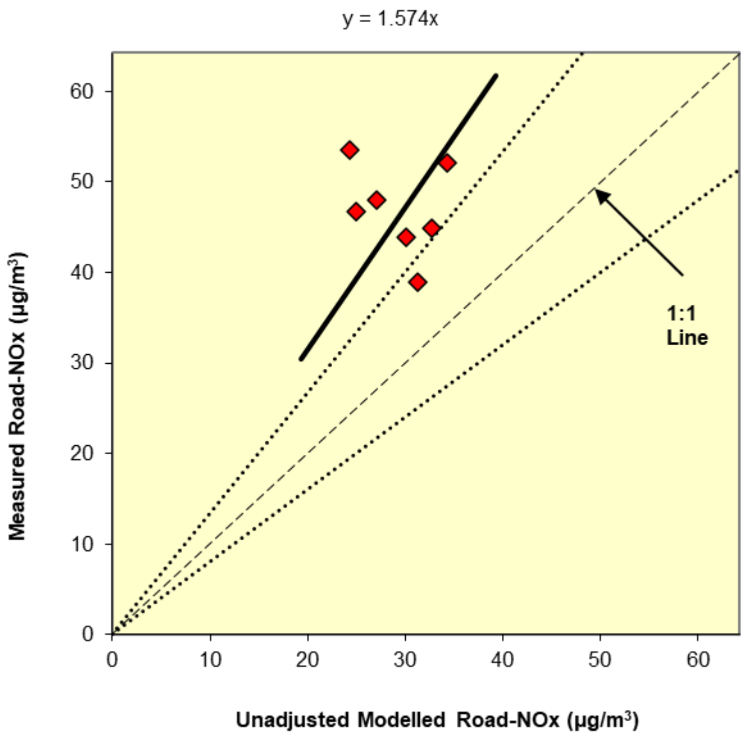

Figure A2-3: Comparison of Measured Road NOx to Unadjusted Modelled Road NOx Concentrations in 2018. The dashed lines show ± 25%.

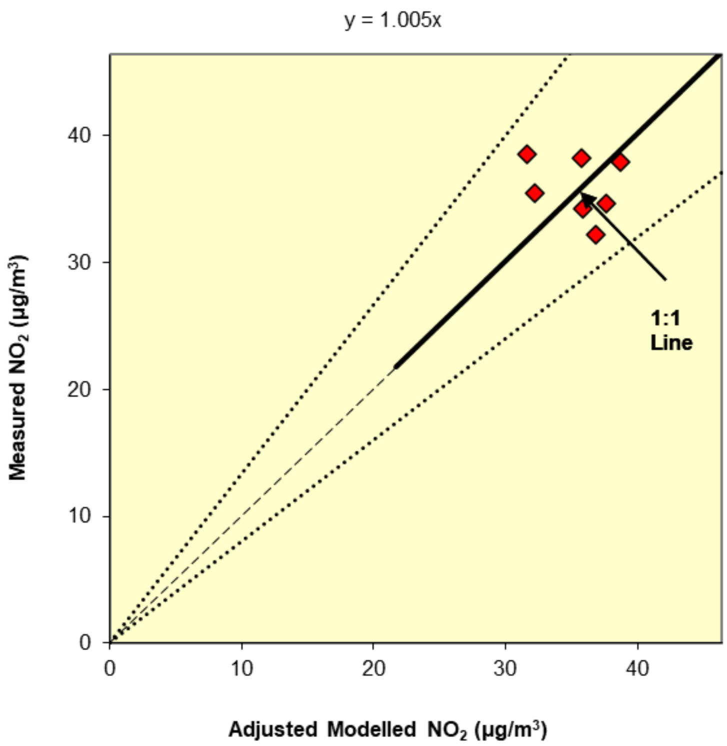

Figure A2-4: Comparison of Measured Total NO_2 to Final Adjusted Modelled Total NO_2 Concentrations in 2018. The dashed lines show ± 25%.

A2.14 Table A2-2 shows the statistical parameters relating to the performance of the model, as well as the 'ideal' values (Defra, 2022). The values calculated for the model demonstrate that it is performing well.

Table A2-2: Statistical Model Performance

Statistical Parameter	Model-Specific Value	'Ideal' Value
Correlation Coefficient [a]	-0.25	1
Root Mean Square Error (RMSE) [b]	3.72	0
Fractional Bias [c]	0.01	0

[a] Used to measure the linear relationship between predicted and observed data. A value of zero means no relationship and a value of 1 means absolute relationship.

[b] Used to define the average error or uncertainty of the model. The units of RMSE are the same as the quantities compared (i.e. µg/m³). TG22 (Defra, 2022) outlines that, ideally, a RMSE value within 10% of the air quality objective for NO_2 for human health (4µg/m³) would be derived. If RMSE values are higher than 25% of the objective (10 µg/m³) it is recommended that the model is revisited.

[c] Used to identify if the model shows a systematic tendency to over or under predict. Negative values suggest a model over-prediction and positive values suggest a model under-prediction.

A2.15 The model verification and adjustment described above follows a standard method which is common to most air quality assessments. The current study has gone further, and tested the performance of the same adjusted model against measurements made in 2021 and 2023. However, this is hindered by not having specific traffic data for these years, meaning that 2018 flows have been used to represent both 2021 and 2023. The model has been run using 2021/2023 emissions factors, background concentrations and meteorological data for all monitoring sites with relevant data in each year with the exception of the three sites excluded in 2018. The modelled road-NOx concentrations have all been adjusted by multiplying by 1.574. The results are shown in Figure A2-5 and Figure A2-6.

A2.16 The model consistently over-predicts concentrations in 2021. This is largely to be expected owing to the expected influence of the COVID-19 Pandemic on traffic flows in 2021.

A2.17 There is appreciable scatter to the 2023 measurements, which is not reflected in the model results. This suggests that the model is unable to fully capture nuances in dispersion very close to the road within this enclosed setting. The SACs are all set much further back from main roads and so this issue is unlikely to affect predictions within the SACs. The model over-predicts on average in 2023 by around 10%. This is despite not including any traffic growth between 2018 and 2023 and suggests that emissions per vehicle fell more rapidly than is predicted by the EFT.

A2.18 These additional verification results provide confidence that using the 2018-based traffic model alongside 2021-based background concentrations provides a worst-case assessment of future-year concentrations.

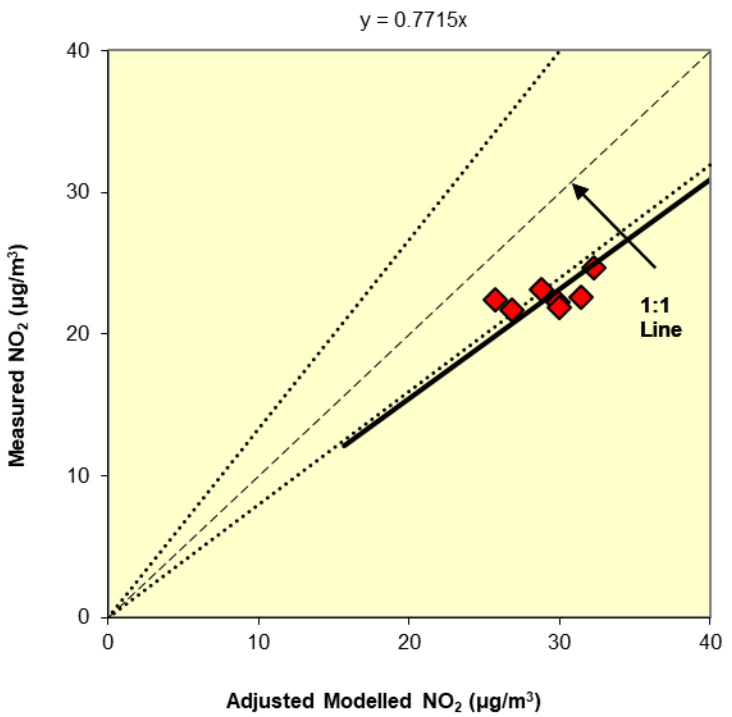

Figure A2-5: Comparison of Measured Total NO_2 to Modelled Total NO_2 Concentrations in 2021. The dashed lines show ± 25%.

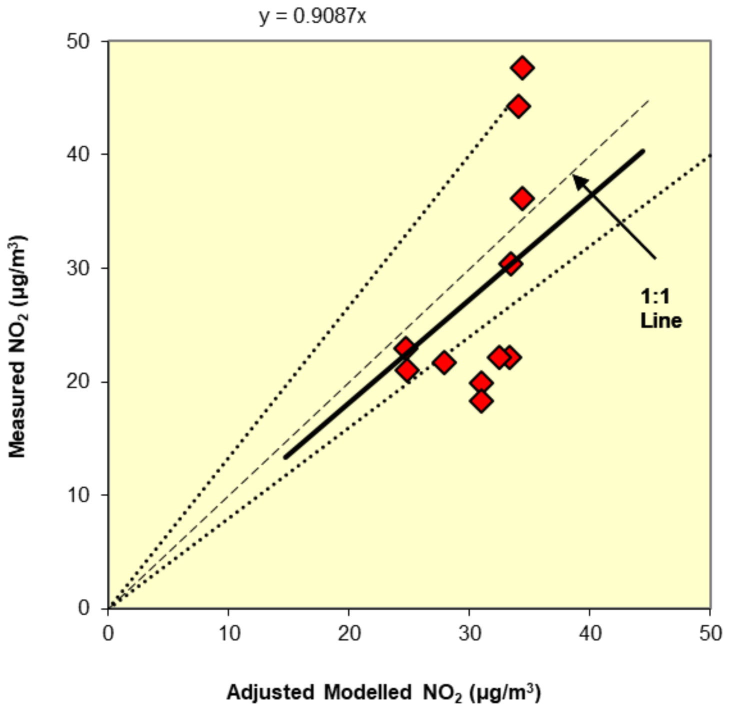

Figure A2-6: Comparison of Measured Total NO_2 to Modelled Total NO_2 Concentrations in 2023. The dashed lines show ± 25%.

NH_3

A2.19 There are no local roadside NH_3 monitoring sites which can be used to verify the model results for traffic-related NH_3 emissions. Development of the CREAM emissions model (AQC, 2025) (AQC, 2020a) included verification of concentrations predicted using the ADMS-Roads dispersion model and measured traffic data against ambient measurements from the most detailed network of roadside monitoring sites which has ever been run in the UK. No further adjustment to the model predictions is considered appropriate.

A2.20 There is an NH_3 monitoring site operated by Defra (Wytham Wood National Ammonia Monitoring Network (NAMN) site) very close to the study area. This is shown in Figure A2-1. The site is located well away from roads and is therefore well suited to test the performance of the background NH_3 concentrations used in the study (the values taken from APIS take account of measurements but are not tailored to this precise local setting). The type of monitor used at Wytham Wood changed in 2017, although in theory this should not cause a step change in measured concentrations. Figure A2-2 shows that measured concentrations have fluctuated between 2005 and 2023, with some indication of consistent and significant reductions since 2018 (the 2023 data reported across the UK may be anomalously low, but these data are not relied on for the conclusions of this assessment).

A2.21 Figure A2-2 also shows the APIS background data for each year for the grid square which encompasses the Wytham Wood site. The predictions have been consistently higher than the measurements. Positive bias in the model has ranged from 0.04 $\mu g/m^3$ to 0.67 $\mu g/m^3$, and averaged at around 0.3 $\mu g/m^3$. This information is not sufficient to warrant adjusting the APIS-derived background data, but it provides reassurance that the background NH_3 concentrations used in this assessment err on the side of caution and are most likely to over-predict NH_3 concentrations.

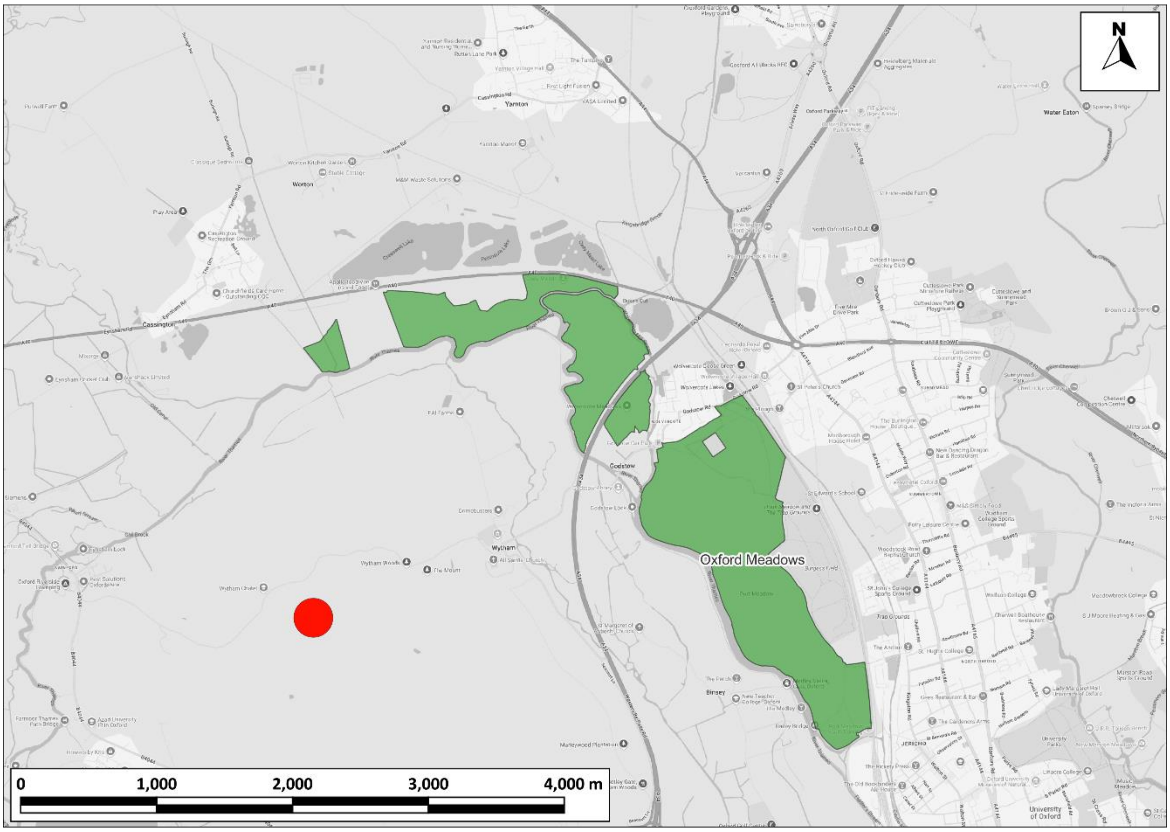

Figure A2-1: Wytham Wood National Ammonia Monitoring Network Site

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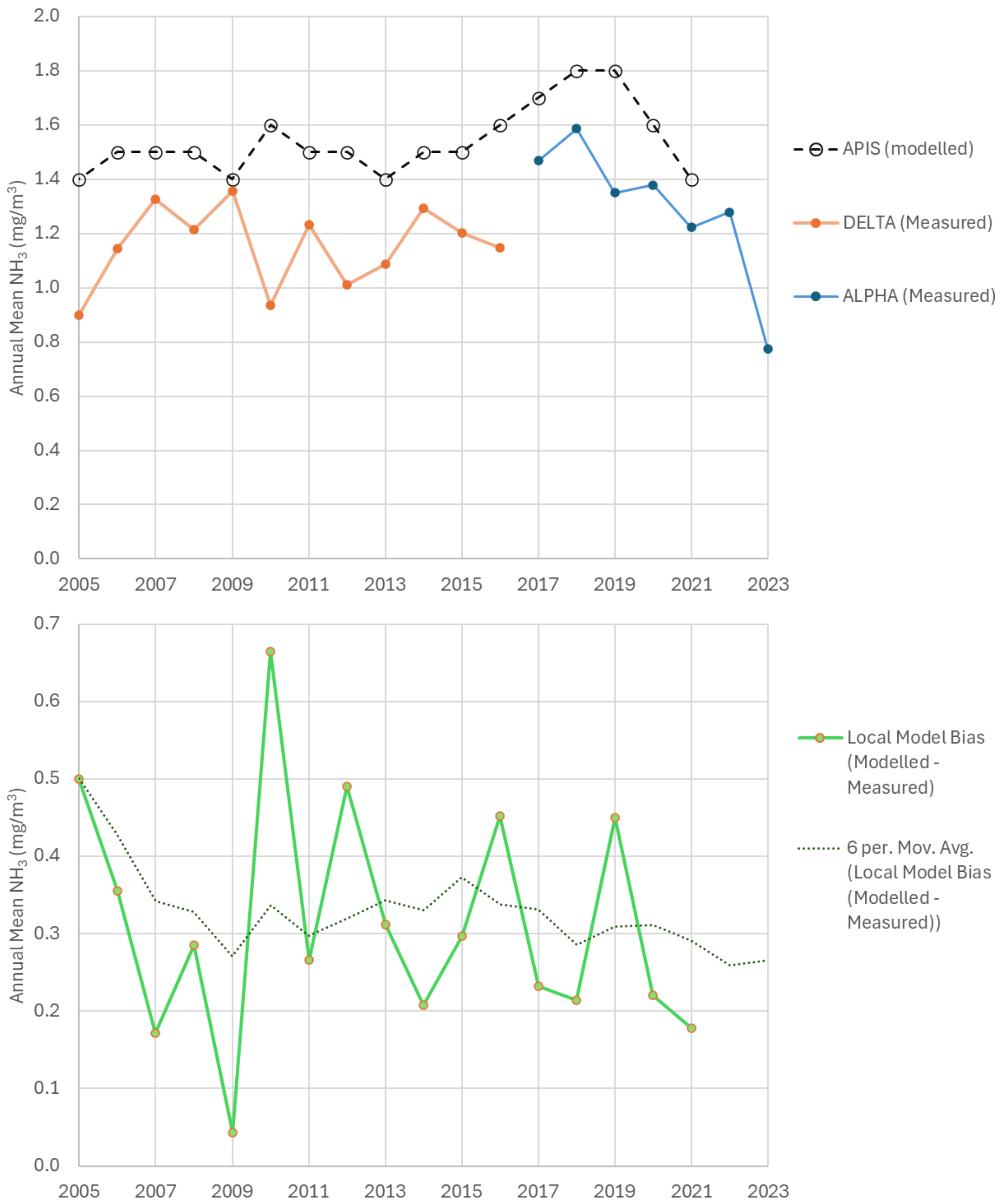

Figure A2-2: Trends in NH_3 Measurements at Wytham Wood National Ammonia Monitoring Network Site, alongside Predictions on APIS for the Same Location

Post-processing

A2.22 The model predicts road-NOx concentrations at each receptor location. These concentrations have been adjusted using the adjustment factor set out above, which, along with the background NO_2 (derived from the national maps provided by Defra for Local Air Quality Management), has been processed through the NOx to NO_2 calculator which is also available on the Defra LAQM Support website (Defra, 2025). The traffic mix within the calculator has been set to "All UK traffic", which is considered suitable for the study area. The calculator predicts the component of NO_2 based on the adjusted road-NOx and the background NO_2.

Deposition Rates

A2.23 Deposition of NO_2 has not been included within the dispersion model because this is calculated from NOx outside of the model. Instead, deposition has been calculated from the predicted ambient concentrations using the deposition velocities set out in Table A2-1. Deposition velocities refer to a height above ground, typically 1 or 2 m, although in practice the precise height makes little difference and here they have been applied to concentrations predicted at a height of 1.5 m above ground. The velocities are applied simply by multiplying a concentration (µg/m^3) by the velocity (m/s) to predict a deposition flux (µg/m^2/s) and then scaling by time and area to represent kg/ha/yr of the nitrogen component of the molecule. The deposition velocity for NH_3 has been included within the ADMS-Roads model to allow for the calculation of depletion. NH_3 deposits much more rapidly than NO_2, meaning that while it is important to include depletion for NH_3, it is relatively trivial for NO_2.

Table A2-1: Deposition Velocities Used in This Assessment

Pollutant	Deposition Velocity (m/s)	Reference
NO_2	0.0015 m/s (Short vegetation) 0.003 m/s (Woodland)	AQTAG06 (AQTAG, 2011)
NH_3	0.02 m/s (Short vegetation) 0.03 m/s (Woodland)	AQTAG06 (AQTAG, 2011)

A2.24 Wet deposition of the emitted pollutants close to the emission source will be restricted to wash-out, or below cloud scavenging. For this to occur, rain droplets must come into contact with the gas molecules before they hit the ground. Falling raindrops displace the air around them, effectively pushing gasses away. AQTAG06 guidance (AQTAG, 2011) is that the wet deposition of sulphur dioxide, nitrogen dioxide and NH3 is not significant within a short range. It has thus not been included.

A2.25 Deposition may have an acidifying effect through the release of acid protons during chemical transformation in the soil or biota. Thus, even alkaline gases such as NH3 can have an acidifying effect. The acidity CLos are expressed as equivalents ('eq'), referring to the molar equivalent of potential acidity. This is calculated from the mass (in g) of the deposited element, taking account of both its atomic mass and its valency. For example, the acidifying potential (in eq) of both ammonium (NH_4^+) and nitrate (NO_3^-) is 1/14 times the deposited mass in grammes (with 14 being the atomic mass of nitrogen). The species included in the calculation of acid deposition, and their calculated acidifying potentials, are set out in Table A2-2.

Table A2-2: Species Included in Acid Deposition Calculations

Pollutant	Calculation (kg deposition to keq)
N (from deposited NO_2 and NH_3)	0.071

A3 Tabulated Results from Transects

A3.1 Table A3-1 to Table A3-9 set out all of the model predictions along the transects.

Table A3-1: NH_3 PECs Along Transects (µg/m³)

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARC	2	2.14	2.16	2.10	2.38	2.37	2.36
ARC	3	2.01	2.04	1.99	2.23	2.22	2.22
ARC	5	1.84	1.86	1.83	2.03	2.02	2.01
ARC	9	1.64	1.66	1.65	1.79	1.78	1.78
ARC	17	1.46	1.47	1.49	1.57	1.57	1.57
ARC	33	1.32	1.32	1.36	1.41	1.41	1.41
ARC	65	1.23	1.24	1.28	1.31	1.31	1.31
ARC	129	1.19	1.19	1.24	1.25	1.25	1.25
ARC	200	1.17	1.17	1.23	1.24	1.24	1.24
ARD	2	2.01	2.03	1.98	2.20	2.20	2.19
ARD	3	1.89	1.91	1.87	2.06	2.06	2.06
ARD	5	1.73	1.74	1.73	1.87	1.87	1.87
ARD	9	1.55	1.56	1.56	1.67	1.66	1.66
ARD	17	1.38	1.39	1.42	1.48	1.48	1.48
ARD	33	1.27	1.27	1.32	1.35	1.35	1.35
ARD	65	1.20	1.20	1.25	1.27	1.27	1.27
ARD	129	1.16	1.16	1.22	1.23	1.23	1.23
ARD	200	1.15	1.15	1.21	1.21	1.21	1.21
ARB	2	1.98	2.00	1.96	2.16	2.16	2.15
ARB	3	1.88	1.89	1.86	2.04	2.03	2.03
ARB	5	1.73	1.74	1.73	1.87	1.86	1.86
ARB	9	1.56	1.57	1.58	1.67	1.67	1.67
ARB	17	1.40	1.41	1.44	1.50	1.50	1.49
ARB	33	1.28	1.29	1.33	1.36	1.36	1.36
ARB	65	1.22	1.22	1.27	1.29	1.28	1.28
ARB	129	1.18	1.18	1.24	1.25	1.25	1.25
ARB	200	1.17	1.17	1.24	1.24	1.24	1.24
ARA	2	3.00	2.30	2.23	2.54	2.52	2.52
ARA	3	2.14	2.16	2.11	2.38	2.37	2.36
ARA	5	1.94	1.96	1.93	2.15	2.14	2.13
ARA	9	1.71	1.73	1.72	1.87	1.86	1.86
ARA	17	1.50	1.51	1.53	1.62	1.61	1.61
ARA	33	1.34	1.35	1.39	1.43	1.43	1.43
ARA	65	1.25	1.25	1.31	1.33	1.33	1.33
ARA	129	1.21	1.21	1.26	1.27	1.27	1.27
ARA	200	1.19	1.19	1.25	1.26	1.26	1.26

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARE	2	2.27	2.30	2.23	2.54	2.52	2.52
ARE	3	2.15	2.17	2.12	2.39	2.37	2.37
ARE	5	1.97	1.99	1.96	2.17	2.16	2.16
ARE	9	1.76	1.77	1.76	1.92	1.91	1.91
ARE	17	1.56	1.57	1.58	1.68	1.68	1.68
ARE	33	1.39	1.40	1.44	1.49	1.49	1.49
ARE	65	1.29	1.29	1.34	1.37	1.37	1.37
ARE	129	1.24	1.24	1.30	1.31	1.31	1.31
ARE	200	1.22	1.22	1.28	1.29	1.29	1.29
CFH	2	1.52	1.51	1.55	1.63	1.64	1.64
CFH	3	1.49	1.48	1.53	1.60	1.60	1.60
CFH	5	1.46	1.45	1.51	1.56	1.56	1.56
CFH	9	1.43	1.42	1.49	1.52	1.52	1.52
CFH	17	1.40	1.40	1.48	1.49	1.49	1.49
CFH	33	1.39	1.39	1.47	1.47	1.47	1.47
CFH	65	1.38	1.38	1.46	1.46	1.46	1.46
CFH	129	1.38	1.38	1.46	1.46	1.46	1.46
CFH	200	1.38	1.38	1.46	1.46	1.46	1.46
CFB	2	1.46	1.45	1.52	1.51	1.51	1.51
CFB	3	1.45	1.44	1.51	1.50	1.50	1.50
CFB	5	1.43	1.43	1.50	1.49	1.50	1.50
CFB	9	1.41	1.41	1.49	1.49	1.49	1.49
CFB	17	1.40	1.40	1.48	1.48	1.48	1.48
CFB	33	1.40	1.40	1.48	1.48	1.48	1.48
CFB	65	1.39	1.39	1.47	1.47	1.47	1.47
CFB	129	1.39	1.39	1.47	1.47	1.47	1.47
CFB	200	1.38	1.38	1.47	1.47	1.47	1.47
CFA	2	1.58	1.56	1.61	1.60	1.60	1.60
CFA	3	1.55	1.54	1.59	1.58	1.59	1.59
CFA	5	1.52	1.51	1.57	1.56	1.56	1.56
CFA	9	1.48	1.48	1.54	1.54	1.54	1.54
CFA	17	1.45	1.45	1.52	1.52	1.52	1.52
CFA	33	1.43	1.43	1.51	1.51	1.51	1.51
CFA	65	1.42	1.42	1.50	1.50	1.50	1.50
CFA	129	1.41	1.41	1.49	1.49	1.49	1.49
CFA	200	1.41	1.41	1.49	1.49	1.49	1.49
CFD	2	1.50	1.49	1.55	1.54	1.54	1.54
CFD	3	1.49	1.48	1.54	1.53	1.53	1.53
CFD	5	1.46	1.46	1.53	1.52	1.52	1.52
CFD	9	1.44	1.44	1.52	1.51	1.51	1.51
CFD	17	1.43	1.43	1.51	1.50	1.50	1.50

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
CFD	33	1.42	1.42	1.50	1.50	1.50	1.50
CFD	65	1.41	1.41	1.49	1.49	1.49	1.49
CFD	129	1.41	1.41	1.49	1.49	1.49	1.49
CFD	200	1.41	1.41	1.49	1.49	1.49	1.49
OMA	2	1.81	1.77	1.77	1.95	1.95	1.94
OMA	3	1.75	1.72	1.73	1.88	1.88	1.88
OMA	5	1.67	1.65	1.68	1.79	1.79	1.79
OMA	9	1.58	1.56	1.61	1.69	1.69	1.69
OMA	17	1.49	1.49	1.55	1.59	1.59	1.59
OMA	33	1.43	1.43	1.50	1.52	1.52	1.52
OMA	65	1.40	1.40	1.48	1.49	1.49	1.49
OMA	120	1.39	1.39	1.47	1.47	1.47	1.47
OMA	200	1.38	1.38	1.46	1.46	1.46	1.46
OMX	2	2.58	2.61	2.54	2.82	2.82	2.81
OMX	3	2.43	2.46	2.40	2.65	2.65	2.64
OMX	5	2.21	2.23	2.20	2.40	2.40	2.39
OMX	9	1.95	1.96	1.97	2.11	2.11	2.10
OMX	17	1.70	1.71	1.74	1.83	1.83	1.83
OMX	33	1.53	1.53	1.59	1.63	1.63	1.63
OMX	65	1.43	1.43	1.50	1.52	1.52	1.52
OMX	129	1.39	1.39	1.46	1.47	1.47	1.47
OMX	200	1.37	1.37	1.45	1.46	1.46	1.46
OMY	2	2.63	2.67	2.59	2.96	2.95	2.94
OMY	3	2.47	2.50	2.45	2.76	2.76	2.75
OMY	5	2.24	2.27	2.24	2.49	2.48	2.48
OMY	9	1.97	1.99	1.99	2.16	2.16	2.15
OMY	17	1.72	1.73	1.76	1.86	1.86	1.85
OMY	33	1.53	1.54	1.59	1.64	1.64	1.64
OMY	65	1.43	1.43	1.50	1.52	1.52	1.52
OMY	129	1.38	1.39	1.46	1.47	1.47	1.47
OMY	200	1.37	1.37	1.45	1.45	1.45	1.45
OMZ	2	1.38	1.37	1.45	1.46	1.46	1.46
OMZ	3	1.37	1.37	1.45	1.45	1.45	1.45
OMZ	5	1.37	1.37	1.45	1.45	1.45	1.45
OMZ	9	1.37	1.37	1.45	1.45	1.45	1.45
OMZ	17	1.36	1.36	1.44	1.45	1.45	1.45
OMZ	33	1.36	1.36	1.44	1.44	1.44	1.44
OMZ	65	1.36	1.36	1.44	1.44	1.44	1.44
OMZ	129	1.36	1.36	1.45	1.45	1.45	1.45
OMZ	200	1.37	1.37	1.45	1.45	1.45	1.45
OMV	2	1.50	1.49	1.53	1.60	1.60	1.60

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
OMV	3	1.48	1.47	1.52	1.58	1.58	1.58
OMV	5	1.45	1.44	1.50	1.54	1.54	1.54
OMV	9	1.42	1.42	1.48	1.51	1.51	1.51
OMV	17	1.40	1.40	1.47	1.48	1.48	1.48
OMV	33	1.39	1.38	1.46	1.47	1.47	1.47
OMV	65	1.38	1.38	1.46	1.46	1.46	1.46
OMV	129	1.38	1.38	1.46	1.46	1.46	1.46
OMV	200	1.38	1.38	1.46	1.46	1.46	1.46

Table A3-2: NOx PECs Along Transects (μg/m³)

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARC	2	99.0	75.3	14.0	16.5	16.5	16.4
ARC	3	94.2	71.8	13.6	16.0	15.9	15.9
ARC	5	86.8	66.4	12.9	15.1	15.1	15.0
ARC	9	76.5	58.9	12.0	13.9	13.9	13.9
ARC	17	63.5	49.4	10.9	12.4	12.4	12.3
ARC	33	49.1	38.9	9.7	10.7	10.7	10.7
ARC	65	35.8	29.2	8.5	9.2	9.2	9.2
ARC	129	25.6	21.7	7.6	8.0	8.0	8.0
ARC	200	20.9	18.3	7.2	7.5	7.5	7.5
ARD	2	93.0	71.1	13.5	15.8	15.8	15.7
ARD	3	88.1	67.5	13.1	15.2	15.2	15.2
ARD	5	80.5	62.0	12.4	14.4	14.3	14.3
ARD	9	70.2	54.4	11.5	13.2	13.1	13.1
ARD	17	57.5	45.1	10.4	11.7	11.7	11.7
ARD	33	44.5	35.6	9.3	10.2	10.2	10.2
ARD	65	32.7	26.9	8.2	8.8	8.8	8.8
ARD	129	23.7	20.3	7.4	7.8	7.8	7.8
ARD	200	19.5	17.3	7.0	7.3	7.2	7.2
ARB	2	98.0	74.6	13.8	16.2	16.2	16.2
ARB	3	93.3	71.2	13.4	15.7	15.7	15.6
ARB	5	85.9	65.8	12.7	14.8	14.8	14.8
ARB	9	75.3	58.0	11.8	13.6	13.6	13.6
ARB	17	61.7	48.1	10.6	12.0	12.0	12.0
ARB	33	46.6	37.0	9.3	10.3	10.3	10.3
ARB	65	33.1	27.1	8.1	8.7	8.7	8.7
ARB	129	23.9	20.4	7.3	7.7	7.7	7.7

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARB	200	19.8	17.4	6.9	7.2	7.2	7.2
ARA	2	115.7	87.3	15.3	18.3	18.2	18.2
ARA	3	110.2	83.4	14.8	17.7	17.6	17.6
ARA	5	101.2	76.8	14.0	16.6	16.6	16.6
ARA	9	87.9	67.1	12.9	15.1	15.1	15.0
ARA	17	71.2	54.9	11.5	13.2	13.1	13.1
ARA	33	53.5	42.0	9.9	11.1	11.1	11.1
ARA	65	37.9	30.6	8.6	9.3	9.3	9.3
ARA	129	26.5	22.4	7.6	8.0	8.0	8.0
ARA	200	21.4	18.7	7.2	7.5	7.5	7.5
ARE	2	114.0	86.2	15.1	18.1	18.0	18.0
ARE	3	108.9	82.5	14.7	17.5	17.5	17.4
ARE	5	100.5	76.3	13.9	16.5	16.5	16.4
ARE	9	88.2	67.3	12.9	15.1	15.1	15.0
ARE	17	72.4	55.8	11.5	13.2	13.2	13.2
ARE	33	54.2	42.5	9.9	11.1	11.1	11.1
ARE	65	37.6	30.4	8.5	9.2	9.2	9.2
ARE	129	25.6	21.6	7.5	7.9	7.9	7.9
ARE	200	20.4	17.8	7.0	7.3	7.3	7.3
CFH	2	16.5	14.8	6.8	7.2	7.2	7.2
CFH	3	15.9	14.3	6.8	7.1	7.1	7.1
CFH	5	15.0	13.6	6.7	7.0	7.0	7.0
CFH	9	13.9	12.8	6.6	6.8	6.8	6.8
CFH	17	12.7	11.9	6.5	6.7	6.7	6.7
CFH	33	11.6	11.2	6.4	6.5	6.5	6.5
CFH	65	10.8	10.6	6.4	6.4	6.4	6.4
CFH	129	10.4	10.2	6.3	6.4	6.4	6.4
CFH	200	10.2	10.1	6.3	6.4	6.4	6.4
CFB	2	13.4	12.6	6.7	6.7	6.7	6.7
CFB	3	13.0	12.4	6.6	6.6	6.7	6.7
CFB	5	12.6	12.0	6.6	6.6	6.6	6.6
CFB	9	12.0	11.6	6.6	6.6	6.6	6.6
CFB	17	11.4	11.1	6.5	6.5	6.5	6.5
CFB	33	10.9	10.7	6.5	6.5	6.5	6.5
CFB	65	10.5	10.4	6.5	6.5	6.5	6.5
CFB	129	10.3	10.2	6.4	6.4	6.4	6.4
CFB	200	10.2	10.1	6.4	6.4	6.4	6.4
CFA	2	19.5	17.6	7.4	7.3	7.4	7.4
CFA	3	18.9	17.1	7.3	7.3	7.3	7.3
CFA	5	18.0	16.3	7.2	7.2	7.3	7.3
CFA	9	16.7	15.4	7.1	7.1	7.2	7.2

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
CFA	17	15.3	14.2	7.0	7.0	7.0	7.0
CFA	33	13.8	13.1	6.9	6.9	6.9	6.9
CFA	65	12.5	12.0	6.8	6.8	6.8	6.8
CFA	129	11.4	11.2	6.7	6.7	6.7	6.7
CFA	200	10.9	10.8	6.6	6.6	6.6	6.6
CFD	2	16.5	15.0	7.1	7.1	7.1	7.1
CFD	3	15.9	14.6	7.0	7.0	7.0	7.0
CFD	5	15.2	14.1	7.0	7.0	7.0	7.0
CFD	9	14.3	13.3	6.9	6.9	6.9	6.9
CFD	17	13.2	12.6	6.8	6.8	6.8	6.8
CFD	33	12.3	11.8	6.8	6.8	6.8	6.8
CFD	65	11.5	11.3	6.7	6.7	6.7	6.7
CFD	129	11.0	10.8	6.6	6.6	6.6	6.6
CFD	200	10.7	10.6	6.6	6.6	6.6	6.6
OMA	2	37.1	30.7	10.8	12.2	12.2	12.2
OMA	3	35.7	29.7	10.6	12.0	12.0	12.0
OMA	5	33.6	28.1	10.4	11.6	11.6	11.6
OMA	9	30.5	25.9	10.1	11.2	11.2	11.1
OMA	17	26.8	23.1	9.8	10.6	10.6	10.6
OMA	33	22.8	20.2	9.4	10.0	9.9	9.9
OMA	65	19.5	17.8	9.1	9.4	9.4	9.4
OMA	120	17.3	16.2	9.0	9.2	9.2	9.1
OMA	200	16.5	15.6	8.9	9.1	9.1	9.1
OMX	2	104.4	79.2	17.7	19.4	19.4	19.3
OMX	3	99.3	75.5	17.3	18.9	18.8	18.8
OMX	5	91.1	69.7	16.5	18.0	18.0	17.9
OMX	9	79.3	61.2	15.4	16.7	16.7	16.6
OMX	17	64.5	50.5	14.1	15.0	15.0	15.0
OMX	33	48.9	39.3	12.6	13.3	13.3	13.3
OMX	65	35.5	29.6	11.4	11.8	11.8	11.8
OMX	129	25.9	22.7	10.4	10.6	10.6	10.6
OMX	200	21.7	19.6	9.9	10.1	10.1	10.1
OMY	2	106.8	80.9	17.9	19.9	19.8	19.8
OMY	3	101.4	77.0	17.5	19.3	19.2	19.2
OMY	5	92.9	70.9	16.7	18.3	18.3	18.2
OMY	9	80.8	62.2	15.6	16.9	16.9	16.9
OMY	17	65.8	51.4	14.3	15.3	15.3	15.2
OMY	33	50.0	40.1	12.8	13.5	13.5	13.5
OMY	65	36.7	30.6	11.7	12.1	12.1	12.1
OMY	129	27.3	23.9	10.9	11.2	11.2	11.2
OMY	200	23.2	20.9	10.6	10.8	10.8	10.8

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
OMZ	2	19.0	17.9	10.1	10.2	10.2	10.1
OMZ	3	18.9	17.8	10.1	10.1	10.1	10.1
OMZ	5	18.7	17.7	10.0	10.1	10.1	10.1
OMZ	9	18.4	17.5	10.0	10.1	10.1	10.1
OMZ	17	18.1	17.3	10.0	10.0	10.0	10.0
OMZ	33	17.8	17.0	9.9	10.0	10.0	10.0
OMZ	65	17.4	16.7	9.8	9.9	9.9	9.9
OMZ	129	16.8	16.2	9.7	9.7	9.7	9.7
OMZ	200	16.2	15.7	9.5	9.6	9.6	9.6
OMV	2	21.5	19.8	10.0	10.2	10.2	10.2
OMV	3	21.0	19.4	9.9	10.2	10.2	10.1
OMV	5	20.3	18.8	9.9	10.0	10.0	10.0
OMV	9	19.3	18.1	9.7	9.9	9.9	9.9
OMV	17	18.2	17.2	9.6	9.7	9.7	9.7
OMV	33	17.2	16.5	9.5	9.6	9.6	9.6
OMV	65	16.4	15.8	9.3	9.4	9.4	9.4
OMV	129	15.6	15.2	9.1	9.2	9.2	9.2
OMV	200	15.0	14.7	9.0	9.0	9.0	9.0

Table A3-3: Nitrogen Deposition to Short Vegetation PECs Along Transects (KgN/ha/yr)

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARC	2	24.0	23.2	19.0	20.6	20.5	20.5
ARC	3	23.2	22.4	18.3	19.8	19.7	19.7
ARC	5	22.0	21.2	17.5	18.7	18.6	18.6
ARC	9	20.5	19.8	16.5	17.4	17.3	17.3
ARC	17	19.0	18.3	15.6	16.1	16.1	16.1
ARC	33	17.5	17.0	14.8	15.2	15.1	15.1
ARC	65	16.3	15.9	14.3	14.5	14.5	14.5
ARC	129	15.4	15.2	14.0	14.1	14.1	14.1
ARC	200	15.0	14.8	13.9	14.0	14.0	14.0
ARD	2	23.2	22.3	18.4	19.7	19.6	19.6
ARD	3	22.3	21.5	17.8	18.9	18.9	18.8
ARD	5	21.2	20.4	16.9	17.9	17.8	17.8
ARD	9	19.8	19.1	16.0	16.7	16.7	16.7
ARD	17	18.3	17.7	15.2	15.6	15.6	15.6
ARD	33	17.1	16.6	14.6	14.9	14.9	14.8
ARD	65	16.0	15.7	14.2	14.4	14.3	14.3

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARD	129	15.3	15.1	14.0	14.1	14.1	14.1
ARD	200	15.0	14.8	13.9	14.0	14.0	14.0
ARB	2	22.9	22.1	17.9	19.2	19.1	19.1
ARB	3	22.2	21.3	17.4	18.5	18.5	18.5
ARB	5	21.1	20.3	16.7	17.6	17.5	17.5
ARB	9	19.8	19.0	15.8	16.5	16.4	16.4
ARB	17	18.3	17.7	15.0	15.4	15.4	15.4
ARB	33	17.0	16.4	14.4	14.6	14.6	14.6
ARB	65	15.8	15.5	14.0	14.1	14.1	14.1
ARB	129	15.1	14.9	13.8	13.9	13.9	13.9
ARB	200	14.8	14.7	13.8	13.8	13.8	13.8
ARA	2	25.1	24.1	19.4	21.3	21.2	21.2
ARA	3	24.2	23.3	18.8	20.4	20.3	20.3
ARA	5	22.8	21.9	17.8	19.1	19.1	19.0
ARA	9	21.1	20.3	16.6	17.6	17.5	17.5
ARA	17	19.3	18.5	15.5	16.1	16.1	16.1
ARA	33	17.6	17.0	14.7	15.0	15.0	15.0
ARA	65	16.3	15.8	14.2	14.3	14.3	14.3
ARA	129	15.3	15.0	13.9	13.9	13.9	13.9
ARA	200	14.9	14.7	13.8	13.8	13.8	13.8
ARE	2	24.7	23.8	19.2	20.9	20.9	20.8
ARE	3	23.9	23.0	18.6	20.1	20.1	20.0
ARE	5	22.7	21.8	17.7	19.0	18.9	18.9
ARE	9	21.1	20.3	16.6	17.6	17.5	17.5
ARE	17	19.4	18.6	15.5	16.2	16.2	16.1
ARE	33	17.6	17.0	14.7	15.0	15.0	15.0
ARE	65	16.2	15.7	14.1	14.3	14.3	14.3
ARE	129	15.1	14.9	13.7	13.8	13.8	13.8
ARE	200	14.7	14.5	13.6	13.7	13.7	13.7
CFH	2	14.8	14.7	13.9	14.3	14.4	14.4
CFH	3	14.7	14.5	13.8	14.2	14.2	14.2
CFH	5	14.4	14.3	13.7	13.9	14.0	14.0
CFH	9	14.2	14.1	13.6	13.7	13.7	13.7
CFH	17	14.0	13.9	13.5	13.6	13.6	13.6
CFH	33	13.8	13.8	13.4	13.5	13.5	13.5
CFH	65	13.7	13.7	13.4	13.4	13.4	13.4
CFH	129	13.7	13.7	13.4	13.4	13.4	13.4
CFH	200	13.7	13.7	13.4	13.4	13.4	13.4
CFB	2	14.3	14.2	13.7	13.7	13.7	13.7
CFB	3	14.2	14.2	13.7	13.7	13.7	13.7
CFB	5	14.1	14.1	13.6	13.6	13.6	13.6

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
CFB	9	14.0	14.0	13.6	13.6	13.6	13.6
CFB	17	13.9	13.9	13.5	13.5	13.5	13.5
CFB	33	13.8	13.8	13.5	13.5	13.5	13.5
CFB	65	13.8	13.8	13.5	13.5	13.5	13.5
CFB	129	13.8	13.8	13.5	13.5	13.5	13.5
CFB	200	13.8	13.8	13.5	13.5	13.5	13.5
CFA	2	15.4	15.1	14.3	14.2	14.2	14.2
CFA	3	15.2	15.0	14.2	14.1	14.2	14.2
CFA	5	15.0	14.8	14.0	14.0	14.0	14.0
CFA	9	14.7	14.6	13.9	13.9	13.9	13.9
CFA	17	14.4	14.3	13.8	13.8	13.8	13.8
CFA	33	14.2	14.2	13.7	13.7	13.7	13.7
CFA	65	14.1	14.0	13.7	13.7	13.7	13.7
CFA	129	14.0	13.9	13.6	13.6	13.6	13.6
CFA	200	13.9	13.9	13.6	13.6	13.6	13.6
CFD	2	14.8	14.6	14.0	13.9	13.9	13.9
CFD	3	14.6	14.5	13.9	13.8	13.8	13.8
CFD	5	14.5	14.4	13.8	13.8	13.8	13.8
CFD	9	14.3	14.2	13.8	13.7	13.7	13.7
CFD	17	14.2	14.1	13.7	13.7	13.7	13.7
CFD	33	14.1	14.0	13.7	13.7	13.7	13.7
CFD	65	14.0	13.9	13.6	13.6	13.6	13.6
CFD	129	13.9	13.9	13.6	13.6	13.6	13.6
CFD	200	13.9	13.9	13.6	13.6	13.6	13.6
OMA	2	14.6	14.1	12.2	13.2	13.2	13.2
OMA	3	14.3	13.7	12.0	12.9	12.9	12.8
OMA	5	13.7	13.3	11.7	12.4	12.4	12.4
OMA	9	13.1	12.7	11.3	11.8	11.8	11.8
OMA	17	12.4	12.1	11.0	11.3	11.3	11.3
OMA	33	11.9	11.7	10.8	10.9	10.9	10.9
OMA	65	11.6	11.4	10.7	10.8	10.8	10.8
OMA	120	11.5	11.4	10.8	10.9	10.9	10.9
OMA	200	11.6	11.6	11.0	11.0	11.0	11.0
OMX	2	24.4	23.6	19.2	20.8	20.8	20.7
OMX	3	23.4	22.6	18.5	19.9	19.9	19.8
OMX	5	22.0	21.1	17.4	18.5	18.5	18.5
OMX	9	20.1	19.3	16.1	16.9	16.9	16.9
OMX	17	18.1	17.5	14.8	15.3	15.3	15.3
OMX	33	16.4	15.9	13.9	14.2	14.2	14.1
OMX	65	15.1	14.7	13.3	13.4	13.4	13.4
OMX	129	14.1	13.9	12.9	13.0	13.0	13.0

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
OMX	200	13.7	13.6	12.7	12.8	12.8	12.8
OMY	2	24.8	23.9	19.6	21.6	21.6	21.5
OMY	3	23.7	22.9	18.8	20.5	20.5	20.4
OMY	5	22.2	21.4	17.6	19.0	19.0	19.0
OMY	9	20.3	19.6	16.3	17.2	17.2	17.2
OMY	17	18.3	17.7	15.0	15.6	15.6	15.6
OMY	33	16.6	16.1	14.1	14.4	14.4	14.3
OMY	65	15.4	15.0	13.6	13.7	13.7	13.7
OMY	129	14.6	14.4	13.4	13.4	13.4	13.4
OMY	200	14.4	14.2	13.4	13.4	13.4	13.4
OMZ	2	14.2	14.1	13.4	13.5	13.5	13.5
OMZ	3	14.2	14.1	13.4	13.4	13.4	13.4
OMZ	5	14.2	14.1	13.4	13.4	13.4	13.4
OMZ	9	14.1	14.1	13.4	13.4	13.4	13.4
OMZ	17	14.1	14.0	13.4	13.4	13.4	13.4
OMZ	33	14.0	14.0	13.3	13.4	13.4	13.4
OMZ	65	14.0	13.9	13.3	13.3	13.3	13.3
OMZ	129	13.9	13.8	13.2	13.2	13.2	13.2
OMZ	200	13.8	13.8	13.2	13.2	13.2	13.2
OMV	2	14.6	14.4	13.4	13.8	13.7	13.7
OMV	3	14.4	14.3	13.3	13.6	13.6	13.6
OMV	5	14.2	14.1	13.2	13.4	13.4	13.4
OMV	9	14.0	13.9	13.1	13.3	13.3	13.3
OMV	17	13.9	13.8	13.1	13.1	13.1	13.1
OMV	33	13.8	13.7	13.0	13.1	13.1	13.1
OMV	65	13.7	13.7	13.1	13.1	13.1	13.1
OMV	129	13.8	13.8	13.2	13.2	13.2	13.2
OMV	200	14.0	13.9	13.3	13.4	13.4	13.4

Table A3-4: Nitrogen Deposition to Woodland PECs Along Transects (KgN/ha/yr)

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARC	2	43.4	41.7	33.5	36.0	35.9	35.9
ARC	3	42.1	40.4	32.5	34.8	34.7	34.6
ARC	5	40.1	38.5	31.2	33.0	33.0	32.9
ARC	9	37.7	36.2	29.7	31.0	31.0	31.0
ARC	17	35.1	33.7	28.2	29.1	29.1	29.1
ARC	33	32.5	31.4	27.1	27.6	27.6	27.6

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARC	65	30.3	29.5	26.3	26.6	26.6	26.6
ARC	129	28.7	28.2	25.8	26.0	26.0	26.0
ARC	200	27.9	27.6	25.7	25.7	25.7	25.7
ARD	2	42.0	40.3	32.5	34.5	34.5	34.5
ARD	3	40.7	39.0	31.6	33.4	33.3	33.3
ARD	5	38.8	37.2	30.4	31.8	31.8	31.7
ARD	9	36.4	35.0	29.0	30.0	30.0	30.0
ARD	17	33.9	32.7	27.7	28.4	28.3	28.3
ARD	33	31.7	30.7	26.8	27.2	27.1	27.1
ARD	65	29.8	29.1	26.1	26.3	26.3	26.3
ARD	129	28.4	28.0	25.8	25.9	25.9	25.9
ARD	200	27.8	27.5	25.7	25.7	25.7	25.7
ARB	2	41.8	40.0	32.0	33.9	33.9	33.8
ARB	3	40.6	38.9	31.2	32.9	32.8	32.8
ARB	5	38.9	37.2	30.1	31.4	31.4	31.4
ARB	9	36.6	35.1	28.7	29.8	29.7	29.7
ARB	17	34.2	32.8	27.5	28.2	28.1	28.1
ARB	33	31.7	30.6	26.5	26.9	26.9	26.9
ARB	65	29.6	28.9	25.9	26.1	26.1	26.1
ARB	129	28.2	27.8	25.6	25.7	25.7	25.7
ARB	200	27.7	27.4	25.5	25.6	25.6	25.6
ARA	2	45.4	43.4	34.3	37.2	37.0	37.0
ARA	3	43.9	42.0	33.3	35.8	35.7	35.7
ARA	5	41.8	39.9	31.8	33.9	33.8	33.7
ARA	9	38.9	37.2	30.0	31.5	31.4	31.4
ARA	17	35.8	34.3	28.3	29.2	29.2	29.2
ARA	33	32.8	31.6	27.0	27.5	27.5	27.5
ARA	65	30.4	29.5	26.2	26.4	26.4	26.4
ARA	129	28.6	28.1	25.7	25.8	25.8	25.8
ARA	200	27.8	27.5	25.5	25.6	25.6	25.6
ARE	2	44.9	43.0	34.0	36.7	36.6	36.6
ARE	3	43.6	41.7	33.0	35.5	35.4	35.3
ARE	5	41.6	39.8	31.7	33.7	33.6	33.6
ARE	9	39.0	37.2	30.0	31.5	31.5	31.4
ARE	17	36.0	34.5	28.4	29.4	29.4	29.4
ARE	33	33.0	31.8	27.0	27.6	27.6	27.6
ARE	65	30.3	29.5	26.1	26.4	26.4	26.4
ARE	129	28.4	27.9	25.6	25.7	25.7	25.7
ARE	200	27.6	27.3	25.4	25.4	25.4	25.4
CFH	2	28.0	27.7	26.3	27.0	27.0	27.0
CFH	3	27.7	27.4	26.2	26.7	26.7	26.7

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
CFH	5	27.3	27.1	26.0	26.4	26.4	26.4
CFH	9	26.9	26.7	25.8	26.0	26.0	26.0
CFH	17	26.6	26.4	25.7	25.8	25.8	25.8
CFH	33	26.3	26.2	25.6	25.6	25.6	25.6
CFH	65	26.2	26.1	25.5	25.6	25.6	25.6
CFH	129	26.1	26.1	25.5	25.5	25.5	25.5
CFH	200	26.1	26.0	25.5	25.5	25.5	25.5
CFB	2	27.1	27.0	26.0	25.9	26.0	26.0
CFB	3	27.0	26.8	25.9	25.9	25.9	25.9
CFB	5	26.8	26.7	25.9	25.8	25.9	25.9
CFB	9	26.6	26.5	25.8	25.8	25.8	25.8
CFB	17	26.4	26.4	25.7	25.7	25.7	25.7
CFB	33	26.3	26.3	25.7	25.7	25.7	25.7
CFB	65	26.2	26.2	25.7	25.7	25.7	25.7
CFB	129	26.2	26.2	25.7	25.7	25.7	25.7
CFB	200	26.2	26.2	25.7	25.7	25.7	25.7
CFA	2	28.9	28.5	26.8	26.8	26.8	26.8
CFA	3	28.6	28.2	26.7	26.6	26.7	26.7
CFA	5	28.2	27.9	26.5	26.5	26.5	26.5
CFA	9	27.8	27.5	26.3	26.3	26.3	26.3
CFA	17	27.4	27.2	26.1	26.1	26.1	26.1
CFA	33	27.0	26.9	26.0	26.0	26.0	26.0
CFA	65	26.7	26.6	25.9	25.9	25.9	25.9
CFA	129	26.5	26.5	25.9	25.9	25.9	25.9
CFA	200	26.4	26.4	25.9	25.9	25.9	25.9
CFD	2	27.9	27.6	26.4	26.2	26.3	26.3
CFD	3	27.7	27.5	26.3	26.2	26.2	26.2
CFD	5	27.4	27.2	26.2	26.1	26.1	26.1
CFD	9	27.1	27.0	26.1	26.0	26.0	26.0
CFD	17	26.9	26.8	26.0	25.9	26.0	26.0
CFD	33	26.7	26.6	25.9	25.9	25.9	25.9
CFD	65	26.5	26.5	25.9	25.9	25.9	25.9
CFD	129	26.4	26.4	25.9	25.9	25.9	25.9
CFD	200	26.4	26.4	25.9	25.9	25.9	25.9
OMA	2	32.6	31.5	27.9	29.4	29.4	29.4
OMA	3	32.0	31.0	27.6	28.9	28.9	28.9
OMA	5	31.1	30.2	27.1	28.2	28.2	28.1
OMA	9	30.0	29.3	26.5	27.3	27.3	27.3
OMA	17	28.8	28.3	26.0	26.4	26.4	26.4
OMA	33	27.9	27.5	25.6	25.8	25.8	25.8
OMA	65	27.2	26.9	25.4	25.5	25.5	25.5

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
OMA	120	26.8	26.6	25.3	25.3	25.3	25.3
OMA	200	26.6	26.5	25.2	25.3	25.3	25.3
OMX	2	45.0	43.2	35.0	37.4	37.4	37.3
OMX	3	43.4	41.6	33.8	35.9	36.0	35.9
OMX	5	41.1	39.4	32.2	33.9	33.9	33.9
OMX	9	38.0	36.5	30.2	31.4	31.5	31.4
OMX	17	34.8	33.4	28.3	29.1	29.1	29.0
OMX	33	31.8	30.7	26.9	27.3	27.3	27.3
OMX	65	29.5	28.8	26.0	26.2	26.2	26.2
OMX	129	28.0	27.5	25.6	25.7	25.7	25.7
OMX	200	27.3	27.1	25.4	25.5	25.5	25.5
OMY	2	45.5	43.7	35.4	38.5	38.5	38.4
OMY	3	43.9	42.1	34.2	36.9	36.9	36.8
OMY	5	41.4	39.7	32.5	34.6	34.6	34.6
OMY	9	38.3	36.7	30.4	31.9	31.9	31.9
OMY	17	35.0	33.6	28.4	29.3	29.3	29.3
OMY	33	31.9	30.9	26.9	27.4	27.4	27.4
OMY	65	29.6	28.9	26.1	26.3	26.3	26.3
OMY	129	28.1	27.7	25.6	25.7	25.7	25.7
OMY	200	27.4	27.1	25.5	25.5	25.6	25.5
OMZ	2	27.0	26.8	25.5	25.5	25.5	25.5
OMZ	3	26.9	26.8	25.4	25.5	25.5	25.5
OMZ	5	26.9	26.7	25.4	25.5	25.5	25.5
OMZ	9	26.8	26.7	25.4	25.4	25.4	25.4
OMZ	17	26.8	26.6	25.4	25.4	25.4	25.4
OMZ	33	26.7	26.6	25.4	25.4	25.4	25.4
OMZ	65	26.7	26.6	25.4	25.4	25.4	25.4
OMZ	129	26.6	26.5	25.4	25.4	25.4	25.4
OMZ	200	26.6	26.5	25.4	25.4	25.4	25.4
OMV	2	28.2	27.9	26.0	26.5	26.5	26.5
OMV	3	28.0	27.7	25.9	26.3	26.3	26.3
OMV	5	27.7	27.4	25.7	26.1	26.1	26.1
OMV	9	27.3	27.1	25.6	25.8	25.8	25.8
OMV	17	27.0	26.8	25.4	25.6	25.6	25.6
OMV	33	26.7	26.6	25.4	25.4	25.4	25.4
OMV	65	26.6	26.5	25.3	25.3	25.3	25.3
OMV	129	26.5	26.4	25.3	25.3	25.3	25.3
OMV	200	26.4	26.4	25.3	25.3	25.3	25.3

Table A3-5: Acid Deposition to Short Vegetation PECs Along Transects (Keq/ha/yr)

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARC	2	1.72	1.66	1.35	1.47	1.47	1.46
ARC	3	1.66	1.60	1.31	1.41	1.41	1.41
ARC	5	1.57	1.51	1.25	1.33	1.33	1.33
ARC	9	1.47	1.41	1.18	1.24	1.24	1.24
ARC	17	1.36	1.31	1.11	1.15	1.15	1.15
ARC	33	1.25	1.21	1.06	1.08	1.08	1.08
ARC	65	1.16	1.14	1.02	1.04	1.04	1.04
ARC	129	1.10	1.08	1.00	1.01	1.01	1.01
ARC	200	1.07	1.06	0.99	1.00	1.00	1.00
ARD	2	1.65	1.60	1.31	1.40	1.40	1.40
ARD	3	1.60	1.54	1.27	1.35	1.35	1.35
ARD	5	1.51	1.46	1.21	1.28	1.27	1.27
ARD	9	1.41	1.36	1.14	1.19	1.19	1.19
ARD	17	1.31	1.26	1.09	1.12	1.12	1.11
ARD	33	1.22	1.18	1.04	1.06	1.06	1.06
ARD	65	1.14	1.12	1.02	1.03	1.02	1.02
ARD	129	1.09	1.08	1.00	1.01	1.01	1.00
ARD	200	1.07	1.06	1.00	1.00	1.00	1.00
ARB	2	1.64	1.58	1.28	1.37	1.37	1.37
ARB	3	1.58	1.52	1.24	1.32	1.32	1.32
ARB	5	1.51	1.45	1.19	1.25	1.25	1.25
ARB	9	1.41	1.36	1.13	1.18	1.17	1.17
ARB	17	1.31	1.26	1.07	1.10	1.10	1.10
ARB	33	1.21	1.17	1.03	1.04	1.04	1.04
ARB	65	1.13	1.10	1.00	1.01	1.01	1.01
ARB	129	1.08	1.06	0.99	0.99	0.99	0.99
ARB	200	1.06	1.05	0.98	0.99	0.99	0.99
ARA	2	1.79	1.72	1.39	1.52	1.51	1.51
ARA	3	1.73	1.66	1.34	1.46	1.45	1.45
ARA	5	1.63	1.57	1.27	1.37	1.36	1.36
ARA	9	1.51	1.45	1.19	1.26	1.25	1.25
ARA	17	1.38	1.32	1.11	1.15	1.15	1.15
ARA	33	1.26	1.21	1.05	1.07	1.07	1.07
ARA	65	1.16	1.13	1.01	1.02	1.02	1.02
ARA	129	1.09	1.07	0.99	1.00	1.00	1.00
ARA	200	1.06	1.05	0.98	0.99	0.99	0.99
ARE	2	1.77	1.70	1.37	1.50	1.49	1.49
ARE	3	1.71	1.64	1.33	1.44	1.43	1.43
ARE	5	1.62	1.56	1.26	1.35	1.35	1.35
ARE	9	1.51	1.45	1.18	1.25	1.25	1.25

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARE	17	1.38	1.33	1.11	1.16	1.15	1.15
ARE	33	1.26	1.22	1.05	1.07	1.07	1.07
ARE	65	1.15	1.12	1.01	1.02	1.02	1.02
ARE	129	1.08	1.06	0.98	0.99	0.99	0.99
ARE	200	1.05	1.04	0.97	0.98	0.98	0.98
CFH	2	1.06	1.05	0.99	1.02	1.03	1.03
CFH	3	1.05	1.04	0.99	1.01	1.01	1.01
CFH	5	1.03	1.02	0.98	1.00	1.00	1.00
CFH	9	1.01	1.01	0.97	0.98	0.98	0.98
CFH	17	1.00	0.99	0.96	0.97	0.97	0.97
CFH	33	0.99	0.98	0.96	0.96	0.96	0.96
CFH	65	0.98	0.98	0.96	0.96	0.96	0.96
CFH	129	0.98	0.98	0.96	0.96	0.96	0.96
CFH	200	0.98	0.98	0.96	0.96	0.96	0.96
CFB	2	1.02	1.02	0.98	0.98	0.98	0.98
CFB	3	1.02	1.01	0.98	0.98	0.98	0.98
CFB	5	1.01	1.00	0.97	0.97	0.97	0.97
CFB	9	1.00	1.00	0.97	0.97	0.97	0.97
CFB	17	0.99	0.99	0.97	0.97	0.97	0.97
CFB	33	0.99	0.99	0.97	0.97	0.97	0.97
CFB	65	0.99	0.98	0.97	0.97	0.97	0.97
CFB	129	0.98	0.98	0.97	0.97	0.97	0.97
CFB	200	0.98	0.98	0.96	0.96	0.96	0.96
CFA	2	1.10	15.14	1.02	1.02	1.02	1.02
CFA	3	1.09	15.00	1.01	1.01	1.01	1.01
CFA	5	1.07	14.79	1.00	1.00	1.00	1.00
CFA	9	1.05	14.56	0.99	0.99	0.99	0.99
CFA	17	1.03	14.35	0.99	0.99	0.99	0.99
CFA	33	1.02	14.17	0.98	0.98	0.98	0.98
CFA	65	1.01	14.04	0.98	0.98	0.98	0.98
CFA	129	1.00	13.95	0.97	0.97	0.97	0.97
CFA	200	0.99	13.90	0.97	0.97	0.97	0.97
CFD	2	1.06	14.63	1.00	0.99	0.99	0.99
CFD	3	1.05	14.52	0.99	0.99	0.99	0.99
CFD	5	1.04	14.38	0.99	0.98	0.98	0.98
CFD	9	1.02	14.24	0.98	0.98	0.98	0.98
CFD	17	1.01	14.11	0.98	0.98	0.98	0.98
CFD	33	1.00	14.01	0.98	0.98	0.98	0.98
CFD	65	1.00	13.95	0.97	0.97	0.97	0.97
CFD	129	0.99	13.91	0.97	0.97	0.97	0.97
CFD	200	0.99	13.89	0.97	0.97	0.97	0.97

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
OMA	2	1.04	1.00	0.87	0.94	0.94	0.94
OMA	3	1.02	0.98	0.86	0.92	0.92	0.92
OMA	5	0.98	0.95	0.84	0.88	0.88	0.88
OMA	9	0.93	0.91	0.81	0.84	0.84	0.84
OMA	17	0.89	0.86	0.79	0.81	0.81	0.81
OMA	33	0.85	0.83	0.77	0.78	0.78	0.78
OMA	65	0.83	0.82	0.77	0.77	0.77	0.77
OMA	120	0.82	0.82	0.77	0.78	0.78	0.78
OMA	200	0.83	0.83	0.79	0.79	0.79	0.79
OMX	2	1.74	1.68	1.37	1.49	1.49	1.48
OMX	3	1.67	1.61	1.32	1.42	1.42	1.42
OMX	5	1.57	1.51	1.24	1.32	1.32	1.32
OMX	9	1.44	1.38	1.15	1.21	1.21	1.21
OMX	17	1.30	1.25	1.06	1.09	1.10	1.09
OMX	33	1.17	1.13	0.99	1.01	1.01	1.01
OMX	65	1.08	1.05	0.95	0.96	0.96	0.96
OMX	129	1.01	1.00	0.92	0.93	0.93	0.93
OMX	200	0.98	0.97	0.91	0.91	0.91	0.91
OMY	2	1.77	1.71	1.40	1.54	1.54	1.54
OMY	3	1.70	1.64	1.34	1.46	1.46	1.46
OMY	5	1.59	1.53	1.26	1.36	1.36	1.36
OMY	9	1.45	1.40	1.16	1.23	1.23	1.23
OMY	17	1.31	1.26	1.07	1.11	1.11	1.11
OMY	33	1.19	1.15	1.00	1.03	1.03	1.02
OMY	65	1.10	1.07	0.97	0.98	0.98	0.98
OMY	129	1.05	1.03	0.96	0.96	0.96	0.96
OMY	200	1.03	1.02	0.96	0.96	0.96	0.96
OMZ	2	1.02	1.01	0.96	0.96	0.96	0.96
OMZ	3	1.01	1.01	0.96	0.96	0.96	0.96
OMZ	5	1.01	1.01	0.96	0.96	0.96	0.96
OMZ	9	1.01	1.00	0.96	0.96	0.96	0.96
OMZ	17	1.01	1.00	0.95	0.96	0.96	0.96
OMZ	33	1.00	1.00	0.95	0.95	0.95	0.95
OMZ	65	1.00	1.00	0.95	0.95	0.95	0.95
OMZ	129	0.99	0.99	0.95	0.95	0.95	0.95
OMZ	200	0.98	0.98	0.94	0.94	0.94	0.94
OMV	2	1.04	1.03	0.96	0.98	0.98	0.98
OMV	3	1.03	1.02	0.95	0.97	0.97	0.97
OMV	5	1.02	1.01	0.94	0.96	0.96	0.96
OMV	9	1.00	0.99	0.94	0.95	0.95	0.95
OMV	17	0.99	0.98	0.93	0.94	0.94	0.94

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
OMV	33	0.98	0.98	0.93	0.93	0.93	0.93
OMV	65	0.98	0.98	0.93	0.94	0.94	0.94
OMV	129	0.99	0.99	0.94	0.94	0.94	0.94
OMV	200	1.00	0.99	0.95	0.95	0.95	0.95

Table A3-6: Acid Deposition to Woodland PECs Along Transects (Keq/ha/yr)

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARC	2	3.10	2.98	2.39	2.57	2.56	2.56
ARC	3	3.01	2.88	2.32	2.48	2.48	2.47
ARC	5	2.87	2.75	2.23	2.36	2.35	2.35
ARC	9	2.69	2.58	2.12	2.22	2.21	2.21
ARC	17	2.51	2.41	2.02	2.08	2.08	2.08
ARC	33	2.32	2.24	1.94	1.97	1.97	1.97
ARC	65	2.17	2.11	1.88	1.90	1.90	1.90
ARC	129	2.05	2.01	1.85	1.86	1.86	1.86
ARC	200	1.99	1.97	1.83	1.84	1.84	1.84
ARD	2	3.00	2.88	2.32	2.47	2.46	2.46
ARD	3	2.90	2.79	2.26	2.38	2.38	2.38
ARD	5	2.77	2.66	2.17	2.27	2.27	2.27
ARD	9	2.60	2.50	2.07	2.14	2.14	2.14
ARD	17	2.42	2.33	1.98	2.03	2.02	2.02
ARD	33	2.26	2.19	1.91	1.94	1.94	1.94
ARD	65	2.13	2.08	1.87	1.88	1.88	1.88
ARD	129	2.03	2.00	1.84	1.85	1.85	1.85
ARD	200	1.98	1.96	1.83	1.84	1.84	1.84
ARB	2	2.99	2.86	2.29	2.42	2.42	2.42
ARB	3	2.90	2.78	2.23	2.35	2.35	2.34
ARB	5	2.78	2.66	2.15	2.25	2.24	2.24
ARB	9	2.62	2.51	2.05	2.13	2.12	2.12
ARB	17	2.44	2.34	1.96	2.01	2.01	2.01
ARB	33	2.26	2.19	1.89	1.92	1.92	1.92
ARB	65	2.12	2.06	1.85	1.86	1.86	1.86
ARB	129	2.02	1.99	1.83	1.83	1.83	1.83
ARB	200	1.98	1.95	1.82	1.83	1.83	1.83
ARA	2	3.24	3.10	2.45	2.65	2.64	2.64
ARA	3	3.14	3.00	2.38	2.56	2.55	2.55
ARA	5	2.98	2.85	2.27	2.42	2.41	2.41

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
ARA	9	2.78	2.66	2.14	2.25	2.24	2.24
ARA	17	2.56	2.45	2.02	2.09	2.09	2.08
ARA	33	2.35	2.26	1.93	1.97	1.96	1.96
ARA	65	2.17	2.11	1.87	1.89	1.89	1.89
ARA	129	2.05	2.01	1.83	1.84	1.84	1.84
ARA	200	1.99	1.96	1.82	1.83	1.83	1.83
ARE	2	3.21	3.07	2.43	2.62	2.61	2.61
ARE	3	3.11	2.98	2.36	2.53	2.53	2.52
ARE	5	2.97	2.84	2.26	2.41	2.40	2.40
ARE	9	2.78	2.66	2.14	2.25	2.25	2.25
ARE	17	2.57	2.46	2.03	2.10	2.10	2.10
ARE	33	2.36	2.27	1.93	1.97	1.97	1.97
ARE	65	2.17	2.11	1.86	1.89	1.88	1.88
ARE	129	2.03	1.99	1.83	1.84	1.84	1.84
ARE	200	1.97	1.95	1.81	1.82	1.82	1.82
CFH	2	2.00	1.98	1.88	1.93	1.93	1.93
CFH	3	1.98	1.96	1.87	1.91	1.91	1.91
CFH	5	1.95	1.94	1.86	1.88	1.88	1.88
CFH	9	1.92	1.91	1.84	1.86	1.86	1.86
CFH	17	1.90	1.89	1.83	1.84	1.84	1.84
CFH	33	1.88	1.87	1.83	1.83	1.83	1.83
CFH	65	1.87	1.87	1.82	1.83	1.83	1.83
CFH	129	1.86	1.86	1.82	1.82	1.82	1.82
CFH	200	1.86	1.86	1.82	1.82	1.82	1.82
CFB	2	1.94	1.93	1.86	1.85	1.86	1.86
CFB	3	1.93	1.92	1.85	1.85	1.85	1.85
CFB	5	1.91	1.91	1.85	1.85	1.85	1.85
CFB	9	1.90	1.89	1.84	1.84	1.84	1.84
CFB	17	1.89	1.88	1.84	1.84	1.84	1.84
CFB	33	1.88	1.88	1.84	1.84	1.84	1.84
CFB	65	1.87	1.87	1.83	1.83	1.83	1.83
CFB	129	1.87	1.87	1.83	1.83	1.83	1.83
CFB	200	1.87	1.87	1.83	1.83	1.83	1.83
CFA	2	2.06	2.03	1.92	1.91	1.91	1.91
CFA	3	2.04	2.02	1.91	1.90	1.91	1.91
CFA	5	2.02	1.99	1.89	1.89	1.89	1.89
CFA	9	1.98	1.97	1.88	1.88	1.88	1.88
CFA	17	1.95	1.94	1.87	1.87	1.87	1.87
CFA	33	1.93	1.92	1.86	1.86	1.86	1.86
CFA	65	1.91	1.90	1.85	1.85	1.85	1.85
CFA	129	1.89	1.89	1.85	1.85	1.85	1.85

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
CFA	200	1.89	1.89	1.85	1.85	1.85	1.85
CFD	2	1.99	1.97	1.88	1.87	1.88	1.88
CFD	3	1.98	1.96	1.88	1.87	1.87	1.87
CFD	5	1.96	1.94	1.87	1.86	1.86	1.86
CFD	9	1.94	1.93	1.86	1.86	1.86	1.86
CFD	17	1.92	1.91	1.86	1.85	1.85	1.85
CFD	33	1.91	1.90	1.85	1.85	1.85	1.85
CFD	65	1.89	1.89	1.85	1.85	1.85	1.85
CFD	129	1.89	1.89	1.85	1.85	1.85	1.85
CFD	200	1.89	1.88	1.85	1.85	1.85	1.85
OMA	2	2.33	2.25	1.99	2.10	2.10	2.10
OMA	3	2.28	2.21	1.97	2.06	2.07	2.06
OMA	5	2.22	2.16	1.93	2.01	2.01	2.01
OMA	9	2.14	2.09	1.89	1.95	1.95	1.95
OMA	17	2.06	2.02	1.86	1.89	1.89	1.89
OMA	33	1.99	1.96	1.83	1.84	1.84	1.84
OMA	65	1.94	1.92	1.81	1.82	1.82	1.82
OMA	120	1.91	1.90	1.80	1.81	1.81	1.81
OMA	200	1.90	1.89	1.80	1.81	1.81	1.81
OMX	2	3.21	3.09	2.50	2.67	2.67	2.66
OMX	3	3.10	2.97	2.42	2.57	2.57	2.56
OMX	5	2.93	2.81	2.30	2.42	2.42	2.42
OMX	9	2.72	2.60	2.16	2.25	2.25	2.24
OMX	17	2.48	2.38	2.02	2.08	2.08	2.07
OMX	33	2.27	2.19	1.92	1.95	1.95	1.95
OMX	65	2.11	2.06	1.86	1.87	1.87	1.87
OMX	129	2.00	1.97	1.83	1.83	1.83	1.83
OMX	200	1.95	1.93	1.82	1.82	1.82	1.82
OMY	2	3.25	3.12	2.53	2.75	2.75	2.74
OMY	3	3.13	3.01	2.44	2.63	2.64	2.63
OMY	5	2.96	2.84	2.32	2.47	2.47	2.47
OMY	9	2.74	2.62	2.17	2.28	2.28	2.28
OMY	17	2.50	2.40	2.03	2.09	2.10	2.09
OMY	33	2.28	2.20	1.92	1.96	1.96	1.96
OMY	65	2.12	2.06	1.86	1.88	1.88	1.88
OMY	129	2.01	1.98	1.83	1.84	1.84	1.84
OMY	200	1.96	1.94	1.82	1.82	1.83	1.82
OMZ	2	1.93	1.91	1.82	1.82	1.82	1.82
OMZ	3	1.92	1.91	1.82	1.82	1.82	1.82
OMZ	5	1.92	1.91	1.82	1.82	1.82	1.82
OMZ	9	1.92	1.91	1.81	1.82	1.82	1.82

Name	m from Road	2018	2021	Future Zero Growth	Future Without JLP	Future With JLP	Future In Combination
OMZ	17	1.91	1.90	1.81	1.81	1.82	1.81
OMZ	33	1.91	1.90	1.81	1.81	1.81	1.81
OMZ	65	1.90	1.90	1.81	1.81	1.81	1.81
OMZ	129	1.90	1.89	1.81	1.81	1.81	1.81
OMZ	200	1.90	1.89	1.81	1.81	1.81	1.81
OMV	2	2.01	1.99	1.86	1.90	1.90	1.90
OMV	3	2.00	1.98	1.85	1.88	1.88	1.88
OMV	5	1.98	1.96	1.84	1.86	1.86	1.86
OMV	9	1.95	1.93	1.83	1.84	1.84	1.84
OMV	17	1.93	1.92	1.82	1.83	1.83	1.83
OMV	33	1.91	1.90	1.81	1.82	1.82	1.82
OMV	65	1.90	1.89	1.81	1.81	1.81	1.81
OMV	129	1.89	1.89	1.81	1.81	1.81	1.81
OMV	200	1.89	1.89	1.81	1.81	1.81	1.81

Table A3-7: PCs to NH_3 and NOx Along Transects for Alone and In Combination (IC) Scenarios (µg/m³)

Name	m from Road	Alone 1 NH_3	Alone 2 NH_3	IC 1 NH_3	IC 2 NH_3	Alone 1 NOx	Alone 2 NOx	IC 1 NOx	IC 2 NOx
ARC	2	-0.02	0.27	-0.02	0.26	-0.06	2.48	-0.09	2.45
ARC	3	-0.01	0.23	-0.02	0.23	-0.06	2.34	-0.09	2.31
ARC	5	-0.01	0.19	-0.01	0.18	-0.05	2.13	-0.08	2.10
ARC	9	-0.01	0.13	-0.01	0.13	-0.04	1.83	-0.07	1.81
ARC	17	0.00	0.08	-0.01	0.08	-0.03	1.46	-0.05	1.44
ARC	33	0.00	0.05	0.00	0.05	-0.02	1.05	-0.04	1.03
ARC	65	0.00	0.02	0.00	0.02	-0.01	0.67	-0.02	0.66
ARC	129	0.00	0.01	0.00	0.01	-0.01	0.38	-0.01	0.38
ARC	200	0.00	0.01	0.00	0.01	-0.01	0.26	-0.01	0.25
ARD	2	-0.01	0.21	-0.01	0.21	-0.03	2.27	-0.06	2.24
ARD	3	-0.01	0.18	-0.01	0.18	-0.03	2.13	-0.06	2.11
ARD	5	0.00	0.14	-0.01	0.14	-0.03	1.92	-0.05	1.90
ARD	9	0.00	0.10	0.00	0.10	-0.03	1.63	-0.05	1.61
ARD	17	0.00	0.06	0.00	0.06	-0.02	1.27	-0.04	1.26

Name	m from Road	Alone 1 NH_3	Alone 2 NH_3	IC 1 NH_3	IC 2 NH_3	Alone 1 NOx	Alone 2 NOx	IC 1 NOx	IC 2 NOx
ARD	33	0.00	0.03	0.00	0.03	-0.02	0.91	-0.03	0.90
ARD	65	0.00	0.02	0.00	0.02	-0.01	0.58	-0.02	0.57
ARD	129	0.00	0.01	0.00	0.01	-0.01	0.33	-0.01	0.32
ARD	200	0.00	0.00	0.00	0.00	0.00	0.22	-0.01	0.21
ARB	2	-0.01	0.20	-0.01	0.20	-0.04	2.42	-0.07	2.39
ARB	3	-0.01	0.17	-0.01	0.17	-0.03	2.28	-0.06	2.26
ARB	5	0.00	0.14	-0.01	0.13	-0.03	2.08	-0.06	2.05
ARB	9	0.00	0.10	0.00	0.09	-0.03	1.78	-0.05	1.75
ARB	17	0.00	0.06	0.00	0.06	-0.02	1.39	-0.04	1.38
ARB	33	0.00	0.03	0.00	0.03	-0.02	0.97	-0.03	0.96
ARB	65	0.00	0.01	0.00	0.01	-0.01	0.59	-0.02	0.59
ARB	129	0.00	0.01	0.00	0.01	-0.01	0.34	-0.01	0.34
ARB	200	0.00	0.00	0.00	0.00	0.00	0.23	-0.01	0.23
ARA	2	-0.02	0.30	-0.02	0.29	-0.08	2.95	-0.11	2.91
ARA	3	-0.02	0.26	-0.02	0.26	-0.07	2.79	-0.11	2.76
ARA	5	-0.01	0.21	-0.01	0.21	-0.06	2.54	-0.09	2.50
ARA	9	-0.01	0.14	-0.01	0.14	-0.05	2.16	-0.08	2.13
ARA	17	0.00	0.09	-0.01	0.09	-0.04	1.68	-0.06	1.66
ARA	33	0.00	0.05	0.00	0.04	-0.03	1.17	-0.04	1.16
ARA	65	0.00	0.02	0.00	0.02	-0.02	0.73	-0.02	0.72
ARA	129	0.00	0.01	0.00	0.01	-0.01	0.41	-0.01	0.41
ARA	200	0.00	0.01	0.00	0.01	-0.01	0.27	-0.01	0.27
ARE	2	-0.02	0.29	-0.02	0.28	-0.07	2.93	-0.11	2.89
ARE	3	-0.01	0.25	-0.02	0.25	-0.07	2.78	-0.10	2.74
ARE	5	-0.01	0.21	-0.01	0.20	-0.06	2.54	-0.09	2.50
ARE	9	-0.01	0.15	-0.01	0.15	-0.05	2.18	-0.08	2.15
ARE	17	0.00	0.09	-0.01	0.09	-0.04	1.72	-0.06	1.70
ARE	33	0.00	0.05	0.00	0.05	-0.03	1.20	-0.04	1.19
ARE	65	0.00	0.02	0.00	0.02	-0.02	0.73	-0.02	0.72
ARE	129	0.00	0.01	0.00	0.01	-0.01	0.39	-0.01	0.39

Name	m from Road	Alone 1 NH_3	Alone 2 NH_3	IC 1 NH_3	IC 2 NH_3	Alone 1 NOx	Alone 2 NOx	IC 1 NOx	IC 2 NOx
ARE	200	0.00	0.01	0.00	0.01	-0.01	0.25	-0.01	0.25
CFH	2	0.00	0.08	0.00	0.08	0.01	0.35	0.01	0.35
CFH	3	0.00	0.07	0.00	0.07	0.01	0.31	0.01	0.31
CFH	5	0.00	0.05	0.00	0.05	0.01	0.26	0.01	0.26
CFH	9	0.00	0.03	0.00	0.03	0.01	0.21	0.01	0.21
CFH	17	0.00	0.01	0.00	0.01	0.01	0.14	0.01	0.14
CFH	33	0.00	0.01	0.00	0.01	0.00	0.09	0.00	0.09
CFH	65	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05
CFH	129	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03
CFH	200	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
CFB	2	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02
CFB	3	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02
CFB	5	0.00	0.00	0.00	0.00	0.02	0.01	0.02	0.01
CFB	9	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
CFB	17	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
CFB	33	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
CFB	65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFB	129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFB	200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFA	2	0.00	0.00	0.00	0.00	0.05	0.02	0.05	0.02
CFA	3	0.00	0.00	0.00	0.00	0.05	0.02	0.05	0.02
CFA	5	0.00	0.00	0.00	0.00	0.04	0.01	0.04	0.01
CFA	9	0.00	0.00	0.00	0.00	0.03	0.01	0.03	0.01
CFA	17	0.00	0.00	0.00	0.00	0.03	0.01	0.03	0.01
CFA	33	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00
CFA	65	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
CFA	129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFA	200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFD	2	0.00	-0.01	0.00	-0.01	0.02	-0.01	0.02	-0.01
CFD	3	0.00	-0.01	0.00	-0.01	0.02	0.00	0.02	0.00

Name	m from Road	Alone 1 NH_3	Alone 2 NH_3	IC 1 NH_3	IC 2 NH_3	Alone 1 NOx	Alone 2 NOx	IC 1 NOx	IC 2 NOx
CFD	5	0.00	-0.01	0.00	-0.01	0.01	0.00	0.01	0.00
CFD	9	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
CFD	17	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
CFD	33	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
CFD	65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFD	129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFD	200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OMA	2	0.00	0.17	-0.01	0.17	-0.01	1.42	-0.02	1.40
OMA	3	0.00	0.15	0.00	0.14	-0.01	1.33	-0.02	1.32
OMA	5	0.00	0.12	0.00	0.11	-0.01	1.20	-0.02	1.19
OMA	9	0.00	0.08	0.00	0.08	-0.01	1.01	-0.02	1.00
OMA	17	0.00	0.05	0.00	0.04	0.00	0.78	-0.01	0.77
OMA	33	0.00	0.02	0.00	0.02	0.00	0.54	-0.01	0.53
OMA	65	0.00	0.01	0.00	0.01	0.00	0.33	-0.01	0.33
OMA	120	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.19
OMA	200	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.14
OMX	2	0.00	0.28	-0.01	0.27	-0.01	1.66	-0.09	1.59
OMX	3	0.00	0.25	-0.01	0.24	-0.01	1.57	-0.08	1.50
OMX	5	0.00	0.20	-0.01	0.19	-0.01	1.43	-0.07	1.36
OMX	9	0.00	0.14	-0.01	0.14	-0.01	1.22	-0.06	1.16
OMX	17	0.00	0.08	0.00	0.08	-0.01	0.95	-0.05	0.91
OMX	33	0.00	0.04	0.00	0.04	0.00	0.66	-0.03	0.63
OMX	65	0.00	0.02	0.00	0.02	0.00	0.41	-0.02	0.39
OMX	129	0.00	0.01	0.00	0.01	0.00	0.23	-0.01	0.22
OMX	200	0.00	0.00	0.00	0.00	0.00	0.16	-0.01	0.15
OMY	2	0.00	0.36	-0.01	0.35	-0.02	1.90	-0.09	1.82
OMY	3	0.00	0.31	-0.01	0.30	-0.01	1.78	-0.09	1.71
OMY	5	0.00	0.25	-0.01	0.24	-0.01	1.60	-0.08	1.53
OMY	9	0.00	0.17	-0.01	0.16	-0.01	1.34	-0.07	1.28
OMY	17	0.00	0.10	0.00	0.10	-0.01	1.02	-0.05	0.98

Name	m from Road	Alone 1 NH_3	Alone 2 NH_3	IC 1 NH_3	IC 2 NH_3	Alone 1 NOx	Alone 2 NOx	IC 1 NOx	IC 2 NOx
OMY	33	0.00	0.05	0.00	0.05	-0.01	0.69	-0.03	0.67
OMY	65	0.00	0.02	0.00	0.02	0.00	0.43	-0.02	0.41
OMY	129	0.00	0.01	0.00	0.01	0.00	0.24	-0.01	0.23
OMY	200	0.00	0.00	0.00	0.00	0.00	0.16	-0.01	0.15
OMZ	2	0.00	0.00	0.00	0.00	0.00	0.09	-0.01	0.09
OMZ	3	0.00	0.00	0.00	0.00	0.00	0.08	-0.01	0.08
OMZ	5	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.08
OMZ	9	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07
OMZ	17	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07
OMZ	33	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.06
OMZ	65	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05
OMZ	129	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04
OMZ	200	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04
OMV	2	0.00	0.07	0.00	0.07	0.00	0.22	0.00	0.22
OMV	3	0.00	0.06	0.00	0.06	0.00	0.21	0.00	0.21
OMV	5	0.00	0.04	0.00	0.04	0.00	0.18	0.00	0.18
OMV	9	0.00	0.03	0.00	0.03	0.00	0.15	0.00	0.15
OMV	17	0.00	0.01	0.00	0.01	0.00	0.11	0.00	0.11
OMV	33	0.00	0.01	0.00	0.01	0.00	0.08	0.00	0.08
OMV	65	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.06
OMV	129	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04
OMV	200	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03

Table A3-8: PCs to Nitrogen Deposition to Short Vegetation (SV) and Woodland (W) Along Transects for Alone and In Combination (IC) Scenarios (KgN/ha/yr)

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
ARC	2	-0.08	1.56	-0.11	1.54	-0.13	2.42	-0.16	2.39
ARC	3	-0.07	1.37	-0.09	1.35	-0.11	2.14	-0.14	2.11
ARC	5	-0.06	1.12	-0.07	1.10	-0.09	1.75	-0.11	1.72

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
ARC	9	-0.04	0.82	-0.05	0.81	-0.06	1.29	-0.08	1.27
ARC	17	-0.02	0.54	-0.03	0.53	-0.04	0.86	-0.05	0.84
ARC	33	-0.02	0.32	-0.02	0.31	-0.02	0.51	-0.03	0.51
ARC	65	-0.01	0.17	-0.01	0.17	-0.01	0.28	-0.01	0.28
ARC	129	0.00	0.09	0.00	0.08	0.00	0.14	-0.01	0.14
ARC	200	0.00	0.05	0.00	0.05	-0.01	0.09	-0.01	0.08
ARD	2	-0.04	1.26	-0.05	1.24	-0.06	1.97	-0.08	1.94
ARD	3	-0.03	1.10	-0.05	1.09	-0.05	1.73	-0.07	1.70
ARD	5	-0.03	0.88	-0.04	0.87	-0.04	1.39	-0.06	1.37
ARD	9	-0.02	0.64	-0.03	0.63	-0.03	1.01	-0.04	1.00
ARD	17	-0.01	0.41	-0.02	0.40	-0.02	0.66	-0.03	0.65
ARD	33	-0.01	0.24	-0.01	0.24	-0.01	0.39	-0.02	0.39
ARD	65	-0.01	0.13	-0.01	0.13	-0.01	0.21	-0.01	0.21
ARD	129	0.00	0.06	0.00	0.06	0.00	0.11	-0.01	0.10
ARD	200	0.00	0.04	0.00	0.04	0.00	0.06	0.00	0.06
ARB	2	-0.03	1.19	-0.05	1.17	-0.05	1.87	-0.08	1.84
ARB	3	-0.03	1.05	-0.04	1.04	-0.05	1.65	-0.07	1.63
ARB	5	-0.03	0.85	-0.04	0.84	-0.04	1.35	-0.06	1.33
ARB	9	-0.02	0.62	-0.03	0.61	-0.03	0.99	-0.04	0.98
ARB	17	-0.01	0.40	-0.02	0.39	-0.02	0.64	-0.03	0.63
ARB	33	-0.01	0.22	-0.01	0.22	-0.01	0.37	-0.02	0.36
ARB	65	0.00	0.11	0.00	0.11	-0.01	0.18	-0.01	0.18
ARB	129	0.00	0.05	0.00	0.05	0.00	0.09	-0.01	0.09
ARB	200	0.00	0.03	0.00	0.03	0.00	0.06	0.00	0.06
ARA	2	-0.09	1.74	-0.12	1.72	-0.14	2.71	-0.18	2.68
ARA	3	-0.08	1.54	-0.10	1.52	-0.13	2.41	-0.16	2.38
ARA	5	-0.07	1.25	-0.08	1.24	-0.10	1.96	-0.12	1.94
ARA	9	-0.05	0.90	-0.06	0.89	-0.07	1.42	-0.09	1.40
ARA	17	-0.03	0.57	-0.03	0.56	-0.04	0.91	-0.05	0.90
ARA	33	-0.01	0.32	-0.02	0.32	-0.02	0.52	-0.03	0.51

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
ARA	65	-0.01	0.16	-0.01	0.16	-0.01	0.27	-0.02	0.27
ARA	129	0.00	0.08	0.00	0.08	-0.01	0.13	-0.01	0.13
ARA	200	0.00	0.05	0.00	0.05	0.00	0.08	0.00	0.08
ARE	2	-0.09	1.69	-0.11	1.67	-0.14	2.64	-0.17	2.60
ARE	3	-0.08	1.51	-0.10	1.49	-0.12	2.36	-0.15	2.33
ARE	5	-0.06	1.24	-0.08	1.23	-0.10	1.95	-0.12	1.92
ARE	9	-0.04	0.92	-0.06	0.91	-0.07	1.46	-0.09	1.44
ARE	17	-0.03	0.61	-0.04	0.60	-0.04	0.97	-0.06	0.96
ARE	33	-0.02	0.35	-0.02	0.35	-0.03	0.57	-0.03	0.56
ARE	65	-0.01	0.17	-0.01	0.17	-0.01	0.29	-0.01	0.28
ARE	129	0.00	0.08	0.00	0.08	-0.01	0.13	-0.01	0.13
ARE	200	0.00	0.04	0.00	0.04	0.00	0.07	0.00	0.07
CFH	2	0.03	0.46	0.03	0.46	0.04	0.70	0.04	0.70
CFH	3	0.02	0.38	0.02	0.38	0.03	0.58	0.03	0.58
CFH	5	0.02	0.27	0.02	0.27	0.02	0.41	0.02	0.41
CFH	9	0.01	0.16	0.01	0.16	0.01	0.25	0.01	0.25
CFH	17	0.01	0.09	0.01	0.09	0.01	0.14	0.01	0.14
CFH	33	0.00	0.04	0.00	0.04	0.01	0.06	0.01	0.06
CFH	65	0.00	0.02	0.00	0.02	0.00	0.03	0.00	0.03
CFH	129	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
CFH	200	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
CFB	2	0.02	-0.02	0.02	-0.02	0.03	-0.03	0.03	-0.03
CFB	3	0.02	-0.02	0.02	-0.02	0.03	-0.03	0.03	-0.03
CFB	5	0.01	-0.01	0.01	-0.01	0.02	-0.02	0.02	-0.02
CFB	9	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01
CFB	17	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01
CFB	33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFB	65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFB	129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFB	200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
CFA	2	0.03	-0.01	0.03	-0.01	0.04	-0.02	0.04	-0.02
CFA	3	0.02	-0.01	0.02	-0.01	0.04	-0.02	0.04	-0.02
CFA	5	0.02	-0.01	0.02	-0.01	0.03	-0.02	0.03	-0.02
CFA	9	0.01	-0.01	0.01	-0.01	0.02	-0.01	0.02	-0.01
CFA	17	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01
CFA	33	0.00	-0.01	0.00	-0.01	0.01	-0.01	0.01	-0.01
CFA	65	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01
CFA	129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFA	200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFD	2	0.01	-0.07	0.01	-0.07	0.01	-0.11	0.01	-0.11
CFD	3	0.00	-0.06	0.00	-0.06	0.01	-0.09	0.01	-0.09
CFD	5	0.00	-0.04	0.00	-0.04	0.01	-0.06	0.01	-0.06
CFD	9	0.00	-0.03	0.00	-0.03	0.00	-0.04	0.00	-0.04
CFD	17	0.00	-0.01	0.00	-0.01	0.00	-0.02	0.00	-0.02
CFD	33	0.00	-0.01	0.00	-0.01	0.00	-0.01	0.00	-0.01
CFD	65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFD	129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CFD	200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OMA	2	0.00	0.99	-0.03	0.96	0.00	1.53	-0.04	1.49
OMA	3	0.00	0.87	-0.02	0.84	0.01	1.35	-0.03	1.31
OMA	5	0.00	0.69	-0.02	0.67	0.00	1.08	-0.03	1.05
OMA	9	0.00	0.49	-0.01	0.47	0.00	0.76	-0.02	0.74
OMA	17	0.00	0.29	-0.01	0.28	0.00	0.46	-0.01	0.45
OMA	33	0.00	0.15	0.00	0.15	0.00	0.24	0.00	0.24
OMA	65	0.00	0.07	0.00	0.07	0.00	0.12	0.00	0.11
OMA	120	0.00	0.03	0.00	0.03	0.00	0.06	0.00	0.06
OMA	200	0.00	0.02	0.00	0.02	0.00	0.04	0.00	0.04
OMX	2	0.01	1.58	-0.05	1.52	0.03	2.43	-0.06	2.34
OMX	3	0.01	1.40	-0.04	1.35	0.03	2.15	-0.05	2.07
OMX	5	0.01	1.14	-0.03	1.09	0.02	1.75	-0.04	1.69

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
OMX	9	0.01	0.81	-0.02	0.78	0.02	1.26	-0.03	1.22
OMX	17	0.01	0.50	-0.01	0.48	0.02	0.78	-0.01	0.75
OMX	33	0.00	0.26	0.00	0.25	0.01	0.41	0.00	0.40
OMX	65	0.00	0.12	0.00	0.12	0.01	0.20	0.00	0.19
OMX	129	0.00	0.05	0.00	0.05	0.00	0.08	0.00	0.08
OMX	200	0.00	0.03	0.00	0.03	0.00	0.05	0.00	0.05
OMY	2	0.00	2.00	-0.07	1.93	0.00	3.06	-0.10	2.96
OMY	3	0.00	1.74	-0.06	1.69	0.01	2.68	-0.08	2.59
OMY	5	0.00	1.39	-0.04	1.35	0.01	2.14	-0.06	2.07
OMY	9	0.00	0.97	-0.03	0.94	0.01	1.50	-0.04	1.45
OMY	17	0.00	0.58	-0.01	0.56	0.01	0.90	-0.02	0.87
OMY	33	0.00	0.29	-0.01	0.29	0.01	0.47	-0.01	0.45
OMY	65	0.00	0.14	0.00	0.13	0.01	0.22	0.00	0.21
OMY	129	0.00	0.06	0.00	0.06	0.00	0.09	0.00	0.09
OMY	200	0.00	0.03	0.00	0.03	0.00	0.05	0.00	0.05
OMZ	2	0.00	0.03	0.00	0.03	0.00	0.05	0.00	0.05
OMZ	3	0.00	0.03	0.00	0.03	0.00	0.04	0.00	0.04
OMZ	5	0.00	0.02	0.00	0.02	0.00	0.04	0.00	0.04
OMZ	9	0.00	0.02	0.00	0.02	0.00	0.03	0.00	0.03
OMZ	17	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.02
OMZ	33	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.02
OMZ	65	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
OMZ	129	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
OMZ	200	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
OMV	2	0.00	0.37	0.00	0.37	0.00	0.57	0.00	0.57
OMV	3	0.00	0.31	0.00	0.31	0.00	0.47	0.00	0.47
OMV	5	0.00	0.23	0.00	0.23	0.00	0.35	0.00	0.35
OMV	9	0.00	0.14	0.00	0.14	0.00	0.22	0.00	0.22
OMV	17	0.00	0.08	0.00	0.08	0.00	0.12	0.00	0.12
OMV	33	0.00	0.04	0.00	0.04	0.00	0.06	0.00	0.06

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
OMV	65	0.00	0.02	0.00	0.02	0.00	0.03	0.00	0.03
OMV	129	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
OMV	200	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01

Table A3-9: PCs to Acid Deposition to Short Vegetation (SV) and Woodland (W) Along Transects for Alone and In Combination (IC) Scenarios (Keq/ha/yr)

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
ARC	2	-0.006	0.111	-0.008	0.110	-0.009	0.173	-0.012	0.171
ARC	3	-0.005	0.098	-0.007	0.097	-0.008	0.153	-0.010	0.151
ARC	5	-0.004	0.080	-0.005	0.079	-0.006	0.125	-0.008	0.123
ARC	9	-0.003	0.058	-0.004	0.058	-0.004	0.092	-0.006	0.091
ARC	17	-0.002	0.038	-0.002	0.038	-0.003	0.061	-0.003	0.060
ARC	33	-0.001	0.023	-0.001	0.022	-0.002	0.037	-0.002	0.036
ARC	65	0.000	0.012	-0.001	0.012	-0.001	0.020	-0.001	0.020
ARC	129	0.000	0.006	0.000	0.006	0.000	0.010	0.000	0.010
ARC	200	0.000	0.004	0.000	0.004	0.000	0.006	0.000	0.006
ARD	2	-0.003	0.090	-0.004	0.089	-0.004	0.140	-0.006	0.139
ARD	3	-0.002	0.079	-0.003	0.078	-0.003	0.123	-0.005	0.122
ARD	5	-0.002	0.063	-0.003	0.062	-0.003	0.099	-0.004	0.098
ARD	9	-0.002	0.045	-0.002	0.045	-0.002	0.072	-0.003	0.071
ARD	17	-0.001	0.029	-0.001	0.029	-0.001	0.047	-0.002	0.046
ARD	33	-0.001	0.017	-0.001	0.017	-0.001	0.028	-0.001	0.028
ARD	65	0.000	0.009	0.000	0.009	-0.001	0.015	-0.001	0.015
ARD	129	0.000	0.004	0.000	0.004	0.000	0.008	0.000	0.007
ARD	200	0.000	0.003	0.000	0.003	0.000	0.005	0.000	0.004
ARB	2	-0.002	0.085	-0.004	0.084	-0.004	0.133	-0.005	0.132
ARB	3	-0.002	0.075	-0.003	0.074	-0.003	0.118	-0.005	0.117
ARB	5	-0.002	0.061	-0.003	0.060	-0.003	0.096	-0.004	0.095
ARB	9	-0.001	0.044	-0.002	0.044	-0.002	0.071	-0.003	0.070

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
ARB	17	-0.001	0.028	-0.001	0.028	-0.001	0.046	-0.002	0.045
ARB	33	-0.001	0.016	-0.001	0.016	-0.001	0.026	-0.001	0.026
ARB	65	0.000	0.008	0.000	0.008	0.000	0.013	-0.001	0.013
ARB	129	0.000	0.004	0.000	0.004	0.000	0.006	0.000	0.006
ARB	200	0.000	0.002	0.000	0.002	0.000	0.004	0.000	0.004
ARA	2	-0.007	0.125	-0.008	0.123	-0.010	0.194	-0.013	0.191
ARA	3	-0.006	0.110	-0.007	0.109	-0.009	0.172	-0.011	0.170
ARA	5	-0.005	0.089	-0.006	0.088	-0.007	0.140	-0.009	0.138
ARA	9	-0.003	0.064	-0.004	0.063	-0.005	0.102	-0.006	0.100
ARA	17	-0.002	0.041	-0.002	0.040	-0.003	0.065	-0.004	0.064
ARA	33	-0.001	0.023	-0.001	0.023	-0.001	0.037	-0.002	0.037
ARA	65	0.000	0.012	-0.001	0.011	-0.001	0.019	-0.001	0.019
ARA	129	0.000	0.005	0.000	0.005	0.000	0.009	-0.001	0.009
ARA	200	0.000	0.003	0.000	0.003	0.000	0.006	0.000	0.005
ARE	2	-0.006	0.121	-0.008	0.119	-0.010	0.188	-0.012	0.186
ARE	3	-0.006	0.108	-0.007	0.106	-0.009	0.168	-0.011	0.166
ARE	5	-0.004	0.089	-0.006	0.088	-0.007	0.139	-0.009	0.137
ARE	9	-0.003	0.066	-0.004	0.065	-0.005	0.104	-0.006	0.103
ARE	17	-0.002	0.044	-0.003	0.043	-0.003	0.070	-0.004	0.069
ARE	33	-0.001	0.025	-0.001	0.025	-0.002	0.040	-0.002	0.040
ARE	65	-0.001	0.012	-0.001	0.012	-0.001	0.020	-0.001	0.020
ARE	129	0.000	0.006	0.000	0.005	0.000	0.009	-0.001	0.009
ARE	200	0.000	0.003	0.000	0.003	0.000	0.005	0.000	0.005
CFH	2	0.002	0.033	0.002	0.033	0.003	0.050	0.003	0.050
CFH	3	0.002	0.027	0.002	0.027	0.002	0.041	0.002	0.041
CFH	5	0.001	0.019	0.001	0.019	0.002	0.030	0.002	0.030
CFH	9	0.001	0.012	0.001	0.012	0.001	0.018	0.001	0.018
CFH	17	0.000	0.006	0.000	0.006	0.001	0.010	0.001	0.010
CFH	33	0.000	0.003	0.000	0.003	0.000	0.005	0.000	0.005
CFH	65	0.000	0.001	0.000	0.001	0.000	0.002	0.000	0.002

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
CFH	129	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001
CFH	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFB	2	0.002	-0.002	0.002	-0.002	0.002	-0.002	0.002	-0.002
CFB	3	0.001	-0.001	0.001	-0.001	0.002	-0.002	0.002	-0.002
CFB	5	0.001	-0.001	0.001	-0.001	0.001	-0.001	0.001	-0.001
CFB	9	0.000	-0.001	0.000	-0.001	0.001	-0.001	0.001	-0.001
CFB	17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFB	33	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFB	65	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFB	129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFB	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFA	2	0.002	-0.001	0.002	-0.001	0.003	-0.001	0.003	-0.001
CFA	3	0.002	-0.001	0.002	-0.001	0.003	-0.001	0.003	-0.001
CFA	5	0.001	-0.001	0.001	-0.001	0.002	-0.001	0.002	-0.001
CFA	9	0.001	-0.001	0.001	-0.001	0.001	-0.001	0.001	-0.001
CFA	17	0.000	-0.001	0.000	-0.001	0.001	-0.001	0.001	-0.001
CFA	33	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	-0.001
CFA	65	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFA	129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFA	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFD	2	0.000	-0.005	0.000	-0.005	0.001	-0.008	0.001	-0.008
CFD	3	0.000	-0.004	0.000	-0.004	0.000	-0.006	0.000	-0.006
CFD	5	0.000	-0.003	0.000	-0.003	0.001	-0.004	0.001	-0.004
CFD	9	0.000	-0.002	0.000	-0.002	0.000	-0.003	0.000	-0.003
CFD	17	0.000	-0.001	0.000	-0.001	0.000	-0.001	0.000	-0.001
CFD	33	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	-0.001
CFD	65	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFD	129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CFD	200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OMA	2	0.000	0.071	-0.002	0.069	0.000	0.110	-0.003	0.107

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
OMA	3	0.000	0.062	-0.002	0.060	0.000	0.096	-0.002	0.094
OMA	5	0.000	0.049	-0.001	0.048	0.000	0.077	-0.002	0.075
OMA	9	0.000	0.035	-0.001	0.034	0.000	0.054	-0.001	0.053
OMA	17	0.000	0.021	0.000	0.020	0.000	0.033	-0.001	0.032
OMA	33	0.000	0.011	0.000	0.010	0.000	0.017	0.000	0.017
OMA	65	0.000	0.005	0.000	0.005	0.000	0.008	0.000	0.008
OMA	120	0.000	0.002	0.000	0.002	0.000	0.004	0.000	0.004
OMA	200	0.000	0.001	0.000	0.001	0.000	0.003	0.000	0.003
OMX	2	0.001	0.113	-0.003	0.109	0.002	0.174	-0.004	0.167
OMX	3	0.001	0.100	-0.003	0.096	0.002	0.154	-0.004	0.148
OMX	5	0.001	0.081	-0.002	0.078	0.002	0.125	-0.003	0.120
OMX	9	0.001	0.058	-0.001	0.056	0.001	0.090	-0.002	0.087
OMX	17	0.001	0.036	-0.001	0.034	0.001	0.056	-0.001	0.054
OMX	33	0.000	0.019	0.000	0.018	0.001	0.030	0.000	0.029
OMX	65	0.000	0.009	0.000	0.008	0.001	0.014	0.000	0.014
OMX	129	0.000	0.004	0.000	0.003	0.000	0.006	0.000	0.006
OMX	200	0.000	0.002	0.000	0.002	0.000	0.004	0.000	0.004
OMY	2	0.000	0.143	-0.005	0.138	0.000	0.219	-0.007	0.212
OMY	3	0.000	0.125	-0.004	0.121	0.000	0.191	-0.006	0.185
OMY	5	0.000	0.099	-0.003	0.096	0.001	0.153	-0.004	0.148
OMY	9	0.000	0.069	-0.002	0.067	0.001	0.107	-0.003	0.104
OMY	17	0.000	0.041	-0.001	0.040	0.001	0.065	-0.001	0.062
OMY	33	0.000	0.021	0.000	0.020	0.001	0.033	0.000	0.032
OMY	65	0.000	0.010	0.000	0.009	0.001	0.016	0.000	0.015
OMY	129	0.000	0.004	0.000	0.004	0.000	0.007	0.000	0.007
OMY	200	0.000	0.002	0.000	0.002	0.000	0.004	0.000	0.004
OMZ	2	0.000	0.002	0.000	0.002	0.000	0.004	0.000	0.003
OMZ	3	0.000	0.002	0.000	0.002	0.000	0.003	0.000	0.003
OMZ	5	0.000	0.002	0.000	0.002	0.000	0.003	0.000	0.003
OMZ	9	0.000	0.001	0.000	0.001	0.000	0.002	0.000	0.002

Name	m from Road	Alone 1 SV	Alone 2 SV	IC 1 SV	IC 2 SV	Alone 1 W	Alone 2 W	IC 1 W	IC 2 W
OMZ	17	0.000	0.001	0.000	0.001	0.000	0.002	0.000	0.001
OMZ	33	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001
OMZ	65	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001
OMZ	129	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001
OMZ	200	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001
OMV	2	0.000	0.027	0.000	0.027	0.000	0.040	0.000	0.040
OMV	3	0.000	0.022	0.000	0.022	0.000	0.034	0.000	0.034
OMV	5	0.000	0.016	0.000	0.016	0.000	0.025	0.000	0.025
OMV	9	0.000	0.010	0.000	0.010	0.000	0.016	0.000	0.016
OMV	17	0.000	0.005	0.000	0.005	0.000	0.008	0.000	0.008
OMV	33	0.000	0.003	0.000	0.003	0.000	0.004	0.000	0.004
OMV	65	0.000	0.001	0.000	0.001	0.000	0.002	0.000	0.002
OMV	129	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001
OMV	200	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001

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