



Preliminary Environmental Information
(Work in Progress) Report (PEIR)

Draft Environmental Statement

Chapter 4: Air Quality and Odour

On behalf of
Oxfordshire Railfreight Limited

Prepared by BWB Consulting Ltd
May 2022

CONTENTS

- 4.1 INTRODUCTION
- 4.2 ASSESSMENT SCOPE AND METHODOLOGY
- 4.3 POLICY CONTEXT
- 4.4 BASELINE CONDITIONS
- 4.5 ASSESSMENT OF LIKELY EFFECTS
- 4.6 MITIGATION AND RESIDUAL EFFECTS
- 4.7 CUMULATIVE EFFECTS
- 4.8 SUMMARY AND CONCLUSIONS

FIGURES

FIGURE 4.1: NO₂ DIFFUSION TUBE SURVEY MONITORING LOCATIONS

APPENDICES

APPENDIX 4.1: AIR QUALITY GLOSSARY OF TERMS

4.1 INTRODUCTION

4.1.1 This Chapter summarises the assessment work to be undertaken to date on the Oxfordshire Strategic Rail Freight Interchange (SRFI) with regards to air quality. It is a preliminary draft of the Chapter to be included in the ES and has been produced at this stage for consultation.

4.1.2 Some information needed for the full assessment is not yet available and therefore this Chapter details the methodologies to be applied to assess the impacts, the baseline conditions currently existing at the Main Site and local vicinity, and the potential direct and indirect impacts of the Proposed Development that will be assessed in this chapter when finalised. When the impacts are all known, mitigation measures that may be required to prevent, reduce or offset potential air quality impacts associated with the construction and operation of the Proposed Development will be detailed. Additional surveys are being undertaken as part of the ongoing assessment and these will help inform the technical assessments presented in this chapter when finalised.

4.1.3 This report is necessarily technical in nature, so to assist the reader, a glossary of air quality terminology can be found in Appendix 4.1. A glossary of terms describing the different elements of the scheme referred to throughout this report are set out in Chapter 2 of the draft Environmental Statement.

4.1.4 This Chapter is accompanied by the following appendix:

- Appendix 4.1: Air Quality Glossary of Terms

Competency

4.1.5 BWB Consulting is an engineering and environmental design consultancy and work across a diverse range of public and private sector projects. BWB is Institute of Environmental Management and Assessment (IEMA) 'Quality Mark' Accredited.

4.1.6 The air quality and odour assessments were prepared and reviewed by full members of the Institute of Air Quality Management and the Institution of Environmental Sciences and undertaken in accordance with relevant guidance produced by the Department for Environment, Food and Rural Affairs, the IAQM and Environmental Protection UK.

4.1.7 Our list of consultants working on the project is provided below:

- Joe Hague, Air Quality Consultant, BSc (Hons), AIAQM, AMIEnvSc
- Freya Hoyle, Associate Air Quality Consultant, MSc, BSc, MIAQM, MIEnvSc
- Claire Meddings, Associate Director, CSci, MSc, BSc (Hons), MIAQM, MIEnvSc

4.2 ASSESSMENT SCOPE AND METHODOLOGY

2021 Scoping Opinion

- 4.2.1 An Environmental Impact Assessment (EIA) Scoping Report was submitted to the Planning Inspectorate (PINS) in June 2021 which provided an outline approach for the identification and assessment of likely significant effects for air quality.
- 4.2.2 In July 2021 PINS, on behalf of the Secretary of State (SoS), returned their Scoping Opinion to the Applicant and comments related to air quality are provided in **Table 4.1**, **Table 4.2** and **Table 4.3**.

Table 4.1: Planning Inspectorate’s comments from EIA Scoping Opinion in relation to air quality (June 2021) – Applicant’s proposed matters to scope out

| Applicant’s Proposed Matters to Scope Out | Inspectorate’s Comments | Project Consultant’s Response |
|---|--|---|
| Odour | The Scoping Report indicates that discussions on whether to scope odour into the ES are ongoing. This relates to the relocation of the Severn Trent Green Power ‘In Vessel Composting’ facility. In the absence of information regarding the new location of the facility, the Inspectorate is not able to agree to scope out this matter. The ES should include an assessment of odour effects from the facility. | An odour report will be appended to this chapter, which will consider odour related to the relocation of the Severn Trent Green Power ‘In Vessel Composting’ Facility. The conclusions of the odour report will be detailed within the ES chapter |

Table 4.2: Planning Inspectorate’s comments from EIA Scoping Opinion in relation to air quality (June 2021) – Other points

| Other Points | Inspectorate’s Comments | Project Consultant’s Response |
|-------------------------------------|--|--|
| Air Quality Management Areas (AQMA) | The Scoping Report refers to four AQMAs which are located within ‘the Borough’. The ES should clearly set out and justify the choice of selected AQMAs included for assessment and should consider impacts on any AQMAs which are located in different local authority areas where relevant (with reference to the affected road network). The ES should include a | AQMAs will be identified through a review of the DEFRA AQMA mapping and Annual Status Reports (ASRs) prepared by local authorities within the study area. At the time of writing this chapter, the extent of the road traffic emissions assessment study area was not known and therefore, precise details of which AQMAs will be considered in the ES |

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| | <p>map depicting the location of these AQMAs with respect to the boundary of the Proposed Development.</p> | <p>was not able to be provided. The road traffic screening criteria detailed in IAQM and EPUK guidance¹ will be utilised to consider which AQMAs may be affected by development-generated road traffic movements. Details of which AQMAs may be included in the assessment will be provided in this chapter.</p> |
| <p>Baseline diffusion tube monitoring</p> | <p>The Scoping Report refers to three NO₂ diffusion tube monitoring sites which are located 2km from the Proposed Development. The ES should explain why these locations are representative of air quality conditions at the site. Details of any additional monitoring data from local authority should be included with the ES. The data should be as up to date as possible and represent the area contained within the red line boundary and surrounding the affected road network.</p> | <p>The ES will include justifications for any monitoring data used as part of the air quality assessment, and all details of additional monitoring data from local authorities used in the assessment will be included in an appendix.</p> <p>A baseline NO₂ monitoring survey was deployed in August 2021 for a period of six months to supplement local authority operated monitoring data for use in the model verification and background concentration derivation in the ES. Details of the location of the baseline NO₂ monitoring survey are provided in this draft chapter and full details of the annualisation and bias adjustment processed for the monitoring will also be provided.</p> |
| <p>Likely Significant Effects</p> | <p>The ES should assess the impacts to designated sites identified within proximity to the affected road network from the Proposed Development, alone and cumulatively with other developments. Specific mitigation measures required to address the effects on these sites from air pollutants should be identified and secured.</p> | <p>The ES will consider the potential impact of the Proposed Development on identified designated ecological sites where these are located within the identified distances of the affected road network in accordance with DMRB² and Natural England³ guidance and the Project Ecologist confirms that sensitive features are present within the defined distances. Where required, the assessment will consider nitrogen and acid deposition. Traffic data to be utilised in the assessment will include traffic</p> |

¹ Institute of Air Quality Management and Environmental Protection UK (2017) Land-Use Planning and Development Control: Planning for Air Quality.

² Highways England, (2019), Design Manual for Roads and Bridges LA 105 Air Quality.

³ Natural England (2018) NEA001 Advising CAs on Road Traffic and HRA.

| | | |
|--------------------------|--|---|
| | | flows associated with committed developments where identified by the Project Transport Consultant in discussions with the relevant Highways authority. The results of the assessment will be passed to the Project Ecologist for consideration and measures to mitigate road traffic emissions will be detailed, where applicable. |
| Guidance and methodology | The ES should refer to the following guidance by Natural England when screening for potential impacts on designated sites: 'Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001)'. Cross references should be made between the Transport and Access chapter regarding the identification of the affected road network and the designated sites where impacts may be experienced as a result of the Proposed Development. | The chapter when finalised will refer to Natural England ³ and DMRB ² guidance when determining the requirement to assess the potential impact of the Proposed Development on identified ecological designations. Details of ecological designations considered, including transect locations, critical levels and loads will be included in the finalised chapter. The results of any assessment required will be passed to the Project Ecologist for consideration. |
| Sensitive receptors | The ES should detail all of the sensitive receptors identified for inclusion within the assessment and depict these on a plan. The ES should make specific reference to fish and other aquatic organisms as sensitive receptors due to the potential for adverse effects on these species from construction dust entering watercourses. All receptors included within the assessment should be agreed with relevant consultees, where possible. | Sensitive receptors during both the construction and operation phases of the Proposed Development will be identified in accordance with the relevant guidance documents. This chapter will include figures of all sensitive receptors included in the assessment. There are no ecological designations within 350m of the Main Site containing aquatic organisms that will be affected by construction dust. |
| Study area | The extent of the study area has not yet been defined. The ES should include a figure depicting the affected road network and the air quality study area for construction and operation. The extent of the study area should be agreed with relevant consultation bodies, where possible. | The study area for the construction phase dust assessment will be defined in accordance with the distance buffers set out in IAQM guidance. The study area for the construction phase road traffic emissions assessment will be determined |

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|--|--|---|
| | | <p>based on the criteria set out in IAQM and EPUK guidance, and DMRB guidance.</p> <p>The study area for the operational phase road traffic emissions assessment at human receptors will be determined based on the criteria set out in IAQM and EPUK guidance.</p> <p>The study area for the operational phase road traffic emission assessment at ecological designations will be determined based on the criteria set out in DMRB and Natural England guidance.</p> <p>Details of the study areas will be included in this chapter and figures will be produced illustrating the spatial extent of the study areas for each assessment.</p> <p>The extent of the study area will be provided to the Regulatory Services and Compliance Department at Cherwell District Council and any other relevant councils for their consideration, once the study area has been determined.</p> |
| <p>Construction Environmental Management Plan (CEMP)</p> | <p>The Scoping Report indicates that construction vehicle and plant emissions will be controlled through the CEMP. The Scoping Report does not contain any data regarding quantities of emissions. The ES should account for all emissions (including dust) within the assessment and fully describe all envisaged mitigation measures for the construction phase in the CEMP. The ES should explain how the CEMP will be secured through the DCO.</p> | <p>A construction phase dust assessment will be undertaken in accordance with IAQM guidance. The level of risk of dust soiling, human health effects and ecological effects will be determined and mitigation measures proportionate to the level of risk identified will be incorporated into the CEMP. At this stage, precise details of construction phase activities and phasing are not finalised.</p> |
| <p>Methodology</p> | <p>Table A4 of the Scoping Report shows the assessment of impacts and significance for individual receptors. The ES should explain how the</p> | <p>Sensitive receptors to be considered in the ES will be identified based on the study area determined in accordance with IAQM and EPUK¹</p> |

| | | |
|--|---|---|
| | <p>receptors were identified and whether they have been treated as individuals as indicated in the Scoping Report, or if certain receptors were grouped together. It should be clear how the worst case scenario has been assessed.</p> | <p>guidance for human receptors, and DMRB² and Natural England³ guidance for ecological receptors.</p> <p>Human receptors will be treated as individual sensitive receptors whilst ecological designations will be assessed using transects in accordance with DMRB and Natural England guidance to consider the impact within the designation, where required.</p> <p>The assessment will consider the impact of the Proposed Development on human and ecological receptors, therefore representing a conservative assessment of impacts associated with the Proposed Development.</p> |
|--|---|---|

Table 4.3: Cherwell District Council’s (CDC) comments from EIA Scoping Opinion in relation to air quality (June 2021)

| Topic | CDC’s Comments | Project Consultant’s Response |
|--|---|--|
| <p>Damage Cost Assessment</p> | <p>The assessment should also include a damage cost calculation.</p> | <p>Consultation will be undertaken with Cherwell District Council regarding their request for a damage cost assessment.</p> |
| <p>Consideration of potential emissions from energy plants</p> | <p>“Para 5.80 mentions that consideration of potential emissions from energy plant will be undertaken. Will this include the cumulative effects of the existing Viridor Ardley Energy Recovery Facility? Para 5.102 ‘Cumulative Effects Assessments’ just mentions other major committed and proposed developments.”</p> | <p>Consultation will be undertaken with Cherwell District Council to agree the scope of assessment.</p> <p>At this stage it is not known whether there will be a combustion based energy plant within the Proposed Development. If there is, then a cumulative assessment of on site energy plant combustion and the Viridor ERF will be undertaken, subject to the availability of the relevant data.</p> |

Assessment Methodology

4.2.3 The focus of this draft Chapter is on providing sufficient preliminary information on the likely significant effects of the proposals, so as to facilitate and inform the consultation process. Whilst the focus is on the more important significant effects, in identifying these, the preliminary assessments review a much wider range of potential impacts and effects.

Construction phase dust assessment

4.2.4 An assessment of the potential impacts from the construction of the Proposed Development has not yet been undertaken as final information needed for this assessment is not available at this stage. This assessment will be carried out in accordance with IAQM guidance⁴. The guidance sets out principles to determine the sensitivity of the area and dust emission magnitudes based on those receptors which will experience the maximum impact. The full assessment methodology will be provided in an Appendix to this chapter when finalised and a summary of the assessment steps are provided below:

- Step 1 - screen the requirement for a more detailed assessment. No assessment is required if there are no receptors within a certain distance of the Proposed Development. works;
- Step 2 - assess the risk of dust impacts separately for each of the four activities considered (demolition, earthworks, construction and trackout);
 - Step 2A - determine the potential dust emission magnitude for each of the four activities;
 - Step 2B - determine the sensitivity of the area;
 - Step 2C - determine the risk of dust impacts by combining the findings of steps 2A and 2B.
- Step 3 - determine the site-specific mitigation for each of the four activities, where required; and
- Step 4 - examine the residual and in combination effects and determine significance.

Study area and identification of existing sensitive receptors

4.2.5 Existing sensitive receptors will be identified within the distance bands detailed in the IAQM guidance and considered with regard to dust soiling, human health effects and ecological designated sites. The construction phase dust distance buffers are measured at 20m, 50m, 100m, 200m and 350m from the Main Site and represent the extents of the construction phase dust assessment.

⁴ Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction.

4.2.6 The distance bands provided in IAQM guidance⁴ 'are deliberately chosen to be conservative and take into account the exponential decline in both airborne concentrations and the rate of deposition of dust with distance from the source'.

4.2.7 Sensitive receptors for construction dust will be identified based on the criteria above.

Construction phase road traffic emissions

4.2.8 The Design Manual for Roads and Bridges (DMRB) LA105² states that emissions from construction vehicles on the local road network should be considered where construction is predicted to last for more than six months. The criteria provided in DMRB LA105 stipulates that further assessment of vehicle emissions is required where a change in flow of 1,000 as a 24 hour annual average daily traffic (AADT) movements or more is expected, or the heavy-duty vehicle (HDV) flow will change by 200 AADT or more.

4.2.9 The criteria provided in IAQM and EPUK guidance¹ stipulates that further assessment of vehicle emissions is required where a change of flow of at least 25 HDV AADT movements within or adjacent to an AQMA or 100 HDV AADT movements elsewhere is expected.

4.2.10 CDC confirmed within the Scoping Opinion (reference 21/02008/SCOP) that a detailed assessment of construction phase road traffic is not required, as any potential impacts will be temporary in nature. An assessment of the impact of road traffic emissions associated with construction phase activities is therefore not included in this draft Chapter or the ES.

Operational phase road traffic emissions assessment

4.2.11 A detailed assessment of operational phase road traffic emissions on local air quality will be undertaken in accordance with DEFRA air quality technical guidance⁵, IAQM and EPUK guidance¹ for human sensitive receptors, DMRB LA105² and Natural England guidance³ for ecological sensitive receptors, and National Policy Statement (NPS) for National Networks guidance⁶.

4.2.12 As sufficiently detailed traffic data for the Proposed Development was not available at the time of writing this draft chapter, a detailed assessment of operational phase road traffic emissions is not yet included. Details of the methodology to be applied to the operational phase road traffic emissions assessment are included in this draft chapter.

⁵ DEFRA (2021) Local Air Quality Management Technical Guidance (LAQM TG(16)).

⁶ Department for Transport (DfT) (2014) National Planning Policy Statement for National Networks, HMSO London

4.2.13 Atmospheric Dispersion Modelling System ('ADMS') ADMS-Roads, version 5.0.0.1, will be utilised in the assessment to predict concentrations of oxides of nitrogen ('NO_x') and particulate matter ('PM₁₀' and 'PM_{2.5}') at identified existing human receptor locations and within the designated ecological sites identified within the study area.

Study area and identification of existing sensitive human receptors

4.2.14 The assessment will be undertaken in accordance with DEFRA Local Air Quality Management (LAQM) Technical Guidance⁵ and (IAQM) and Environmental Protection UK (EPUK) guidance¹.

4.2.15 Traffic data provided by the project's Transport Consultants, to be set out in ES Chapter 6: Transport will be screened when available in accordance with these criteria to identify affected road links and the extent of the study area. Additional traffic data for roads in the vicinity of receptors or monitoring locations will be included if required for assessment purposes.

4.2.16 Existing human receptor locations will be identified within the study area determined once traffic data are available for review. Concentrations of NO₂, PM₁₀ and PM_{2.5} will be predicted at these receptors in the operational phase road traffic emissions assessment.

4.2.17 The extent of the study area for the operational phase road traffic emissions assessment and the receptor locations included within the operational phase road traffic emissions assessment will be detailed in this chapter when finalised.

4.2.18 The existing human sensitive receptor locations considered in the assessment will be based on their relative proximity to road links within the study area. Where possible the closest receptors to those road links and junctions will be considered, as these receptors are likely to experience the greatest change in pollutant concentrations as a result of the Proposed Development. The receptors will be located on the facades of the properties closest to the road source.

4.2.19 The existing human receptor locations will be detailed in this chapter when finalised. Pollutant concentrations will be predicted at the height representative of exposure. Ground floor receptors will be modelled at a height of 1.5 metres (m). This excludes schools and nurseries, which will be modelled at 0.8m to represent the lower than average breathing height for children.

4.2.20 Receptors relevant to the short term objectives, as detailed in

4.2.21 **Table 4.4**, will also be identified. These receptors are located where members of the public could be present for a period of time comparable to the short term air quality objectives, but unlikely to be present for extended periods such as those

representative of the annual air quality objectives. Such uses include hotels or restaurants.

Study area and identification of ecological receptors

- 4.2.22 Ecological designations, including Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Local Nature Reserves (LNR) and Ancient Woodlands (AW), are located in the vicinity of the Main Site and some of the road network is anticipated to experience increased road traffic movements as a result of the operation of the Proposed Development.
- 4.2.23 The study area for ecological sites will be determined in accordance with the criteria provided by DMRB LA 105 Air Quality guidance² and Natural England guidance³. In accordance with DMRB LA105, the screening criteria for the 'affected road network' is:
- a change in alignment of more than 5m or more; or
 - a change in daily traffic flows of 1,000 AADT or more; or
 - a change in heavy duty vehicles (HDVs) flows of 200 AADT or more; or
 - a change in speed band.
- 4.2.24 Ecological designations identified within 200m of the affected road network will be considered in the assessment, with consideration given to the location of sensitive features identified by the Project Ecologist within each site, in accordance with the Natural England³ and DMRB LA105 criteria². The locations of the ecological designations will be detailed in Chapter 6 Ecology.

Ecological critical load and level assessment

- 4.2.25 The dispersion modelling software ADMS-Roads will be utilised to predict concentrations of NO_x and nitrogen deposition resulting from additional development-generated road traffic emissions within the identified ecological designations. Transects will be modelled at 10m intervals from the boundary of each designated ecological site adjacent to affected roads, up to 200m from the affected road link, in accordance with IAQM⁷, Natural England³ and DMRB guidance².

Rail emissions

- 4.2.26 DEFRA guidance⁵ provides a screening criterion for both stationary and moving diesel locomotives, which sets out when a more detailed assessment of rail emissions may be required. Consideration of rail emissions will be undertaken within this chapter in accordance with this guidance⁵.

⁷ Institute of Air Quality Management, (2019), A guide to the assessment of air quality impacts on designated nature conservation sites.

- 4.2.27 For mitigation strategies, both DEFRA guidance⁵ and Rail Delivery Group Guidance⁸ will be referred to.

Identification of existing receptor locations

- 4.2.28 The rail emissions will be considered using DEFRA guidance⁵. The guidance provides the following criteria to consider whether an assessment of rail emissions is required:

- where relevant sensitive exposure locations lie within 15m of stationary locomotives; or
- where relevant sensitive exposure locations lie within 30m of identified high diesel usage lines as defined in DEFRA guidance.

Sensitivity of receptors

Construction phase dust emissions

- 4.2.29 A construction phase dust assessment will be included in this chapter when finalised.

Operational phase road traffic emissions

- 4.2.30 Human receptors will be identified based on proximity to the affected road network and will be considered in the assessment in this chapter when finalised. All human receptors will be highly sensitive. Human receptors identified within the vicinity of the Main Site include residential dwellings and schools.

Ecological receptors:

- 4.2.31 International, national or local ecological designated sites are considered sensitive receptors in accordance with DMRB² and Natural England³ guidance.

Assessment scenarios and traffic data

- 4.2.32 Full traffic data was not available at the time of writing this draft chapter and therefore, no detailed air dispersion modelling has yet been undertaken. Traffic data for use in this chapter will be provided by the project transport consultants. 24-hour AADT and HDV flows and average speeds will be provided for the road network to be utilised in the assessment. The extent of this road network will be determined once further traffic data is available, in accordance with the principles of IAQM and EPUK guidance¹, DMRB² and Natural England³ guidance.

- 4.2.33 The following scenarios will be considered in the air dispersion modelling.:

⁸ Rail Delivery Group Guidance Note (2021) Reducing Diesel Emissions in Stations and Depots.

- Scenario 1: Model Verification Year (2019);
- Scenario 2: Base Year (2022);
- Scenario 3: Opening Year Without Development (2026);
- Scenario 4: Opening Year With Development (2026);
- Scenario 5: Completion Year Without Development (2031); and
- Scenario 6: Completion Year With Development (2031).

4.2.34 Committed developments will be included in the traffic data provided for the Opening Year and Completion Year scenarios to enable consideration of cumulative effects associated with simultaneous operation of all identified committed developments required for consideration. Details of committed developments considered in the assessment will be set out in Chapter 3: Transport.

Assessment inputs and calculations

4.2.35 The following inputs will be utilised in the assessment:

- Emission Factors - emission factors will be utilised from the latest version of the DEFRA Emission Factor Toolkit (EFT) available at the time of assessment⁹, for the years of assessment.
- Conversion of oxides of nitrogen - concentrations of NO_x will be predicted using the ADMS-Roads dispersion model. These concentrations will be converted to NO₂ using the latest version of the DEFRA NO_x to NO₂ calculator¹⁰.
- Meteorological Data - hourly sequential meteorological data for the verification year of assessment (2019) will be utilised from the Weston-on-the-Green recording station. This is the closest, most representative recording station to the Proposed Development.
- Surface roughness – a surface roughness of 0.3m will be utilised in the dispersion model, given the location of the existing sensitive receptors within villages close to the Main Site.
- Monin-Obukhov length (MO) – a MO of 30m will be utilised in the dispersion model. This is representative of the Main Site location and surrounding area..
- NO₂ diffusion tube monitoring survey - BWB Consulting Limited has installed a project-specific NO₂ diffusion tube monitoring survey with locations in Upper Heyford, Ardley, Bicester, Middleton Stoney and Weston-on-the-Green. These monitoring locations will be utilised in model verification in addition to local authority monitoring data. The monitoring locations in this survey are detailed in **Table 4.10** and Figure 4.1.

⁹ DEFRA (2021) Emission Factor Toolkit [<https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>]

¹⁰ DEFRA (2020) NO_x to NO₂ Calculator [<https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>]

- DEFRA background maps¹¹ - background concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5} will be obtained for use in verifying the background monitoring undertaken by BWB Consulting Limited and as background concentrations in the assessment. These will be obtained from the pollutant concentration maps provided by DEFRA. The DEFRA pollutant concentration maps are provided as 1 kilometre (km) x 1km grid squares of the UK and will be obtained for the years of assessment (2019, 2022, 2026 and 2031). 2030 data will be used for the 2031 scenarios as this is the latest year for which background mapped concentrations were derived by DEFRA at the time of assessment. The background concentrations used within the assessment will be detailed in full in this chapter when finalised.
- Air Pollution Information System (APIS)¹² - APIS provides critical loads for ecological habitats and will be utilised to obtain nitrogen deposition values relevant for the ecological sites within the study area. Nitrogen deposition values for ecological habitats not included within APIS will be obtained from the project ecological consultant for ecological sites within the study area.
- Model verification - model verification will be undertaken using NO₂ monitoring survey data collected by BWB Consulting Limited, which will be verified with 2019 local authority monitoring data for the study area. Full details of the verification procedure will be provided in an appendix to this chapter. 2020 monitoring data will be available at the time of assessment however, due to the influence of COVID-19 pandemic lockdown restrictions on traffic levels in 2020, monitoring undertaken in 2020 would not be considered representative of 'typical' conditions. Verification of the monitoring survey data will therefore be undertaken utilising 2019 monitoring data as the last year of 'typical' monitoring data, in accordance with the IAQM position statement¹³.
- Calculation of short term PM₁₀ concentrations - the following calculation, as detailed in DEFRA guidance⁵ will be utilised to calculate the number of exceedances of the 24-hour mean PM₁₀ air quality objective.

*No. of 24-hr Mean Exceedances = -18.5 + 0.00145*Annual Mean³ + (206/Annual Mean)*

- Nitrogen deposition conversion - NO_x concentrations predicted within each of the ecological sites will be converted to deposition values using the relevant deposition conversions as provided in DMRB guidance².
- The IAQM released a position statement regarding dealing with the uncertainty in vehicle NO_x emissions within air quality assessments. This recommends that sensitivity analyses be undertaken and professional judgement be applied to consider the scenario where NO_x emissions do not

¹¹ DEFRA (2020) background pollutant concentration maps [<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>]

¹² Air Pollution Information System (APIS) [<http://www.apis.ac.uk/>]

¹³ IAQM (2021) Use of 2020 and 2021 Monitoring Datasets

reduce as rapidly as shown by the EFT. The IAQM position statement¹⁴ has now been withdrawn as there is now a growing body of evidence to suggest that the latest vehicle emission factors reflect the real-world NO_x emissions more accurately. Therefore, a sensitivity analysis assessment will not be undertaken.

Assessment criteria, characterisation of impact and significance criteria

Construction phase dust assessment

4.2.36 The construction dust assessment will be undertaken in accordance with IAQM guidance⁷.

4.2.37 Predicted pollutant concentrations at existing human receptor locations will be compared to the relevant air quality objectives. The current relevant air quality standards and objectives are detailed in

4.2.38 **Table 4.4.**

Table 4.4: Air quality standards and objectives (England)

| Pollutant | Averaging Period | Air Quality Objective (µg.m⁻³) | Date to be Achieved by |
|-------------------|---|--|-------------------------------|
| NO ₂ | Annual Mean | 40 | 31 December 2005 |
| | 1-hour mean not to be exceeded more than 18 times per year | 200 | 31 December 2005 |
| PM ₁₀ | Annual Mean | 40 | 31 December 2004 |
| | 24-hour mean not to be exceeded more than 35 times per year | 50 | 31 December 2004 |
| PM _{2.5} | Annual mean target (15% cut in annual mean urban background exposure) | 25 | 2010-2020 |

Critical levels

¹⁴ Institute of Air Quality Management (2018) Position Statement: Dealing with Uncertainty in Vehicle NO_x Emissions within Air Quality Assessments, Version 1.1

4.2.39 The current relevant annual mean Critical Level for NO_x for the protection of vegetation and ecosystems, as transposed into UK law by the Air Quality Standards and Regulations 2010, as amended, are detailed in **Table 4.5**.

Table 4.5: Annual mean critical level for the protection of vegetation and ecosystems

| Pollutant | Averaging Period | Critical Level (µg.m ⁻³) |
|-----------------|------------------|--------------------------------------|
| NO _x | Annual Mean | 30 |

Critical loads

4.2.40 The level of nitrogen deposition calculated across the transect points within the designated ecological sites will be compared to the lower critical load value to determine whether changes in nitrogen deposition were greater than 1% of the critical load. The critical loads utilised within the assessment will be detailed in this chapter when finalised.

4.2.41 To provide a conservative assessment, the changes in nitrogen deposition will be calculated as a percentage of the lower critical load for each site.

4.2.42 The assessment will consider the potential of likely significant environmental effects as a result of the operation of the Proposed Development.

Determining Significant Impacts

Construction phase dust assessment

4.2.43 Any impacts arising from dust or emissions associated with the construction of the Proposed Development are likely to be local, medium term and temporary in nature. The significance of any impacts will be identified in accordance with IAQM guidance⁷.

4.2.44 Step four of the IAQM guidance examines the residual effects of the Proposed Development and states “*for almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation*”.

4.2.45 The assessment will be used to define appropriate mitigation measures to minimise any potential effects.

Operational phase road traffic emissions assessment

4.2.46 Any impacts associated with operational phase road traffic emissions are likely to be long term and permanent in nature. Impacts will be positive or negative depending on whether an increase or decrease in road traffic movements is experienced on the local road network. The significance of any impacts will be identified in accordance

with reference to the criteria provided by IAQM and EPUK guidance¹, Natural England³ and DMRB LA105², as detailed below.

Human receptors – IAQM and EPUK guidance

4.2.47 The impact of the Proposed Development arising from operational phase road traffic emissions will be determined with regard to the percentage change in pollutant concentrations relative to the relevant Air Quality Assessment Level (AQAL). Predicted pollutant concentrations will be compared to the relevant air quality objectives (as detailed in

4.2.48 **Table 4.4)** and the significance of the impact determined with regard to IAQM and EPUK guidance⁴. Guidance is provided by the IAQM and EPUK to determine the significance of the impact of development-generated road traffic emissions on local air quality. The impact descriptors at human receptor locations are detailed in **Table 4.6** and will be adjusted to the magnitude descriptors used within EIAs. These impact descriptors consider the predicted magnitude of change in pollutant concentrations and the concentration in relation to the relevant air quality objectives (as detailed in

4.2.49 **Table 4.4).**

Table 4.6: IAQM impact descriptors for individual receptors

| Long Term Average Concentrations at Receptor in the Assessment Year | % Change in Concentration Relative to AQAL | | | |
|---|--|------------|----------|----------|
| | 1% | 2-5% | 6-10% | >10% |
| <75% of AQAL (<30µg.m ⁻³) | Negligible | Negligible | Minor | Moderate |
| 76-94% of AQAL (30-38µg.m ⁻³) | Negligible | Minor | Moderate | Moderate |
| 95-102% of AQAL (38-41µg.m ⁻³) | Minor | Moderate | Moderate | Major |
| 103-109% of AQAL(41-44µg.m ⁻³) | Moderate | Moderate | Major | Major |
| >110% (>44µg.m ⁻³) | Moderate | Major | Major | Major |

Note: Figures rounded to the nearest whole number, therefore any values less than 1% after rounding (effectively less than 0.5%) will be described as negligible.

4.2.50 For each effect, it will be concluded whether the effect is ‘beneficial’ or ‘adverse’.

4.2.51 The following terms will be used to define the significance of the effects identified and these can be ‘beneficial’ or ‘adverse’:

- Major effect: where the Proposed Development is likely to cause a considerable change from the baseline conditions and the receptor has limited adaptability, tolerance or recoverability or is of the highest sensitivity. This effect is considered ‘Significant’.
- Moderate effect: where the Proposed Development is likely to cause either a considerable change from the baseline conditions at a receptor which has a degree of adaptability, tolerance or recoverability or a less than considerable change at a receptor that has limited adaptability, tolerance or recoverability. This effect is considered more likely to be ‘Significant’ but will be subject to professional judgement.
- Minor effect: where the Proposed Development is likely to cause a small, but noticeable change from the baseline conditions on a receptor which has limited adaptability, tolerance or recoverability or is of the highest sensitivity; or where the Proposed Development is likely to cause a considerable change from the baseline conditions at a receptor which can adapt, is tolerant of the change or/and can recover from the change. This effect is considered to be ‘Not Significant’ but will be subject to professional judgement.
- Negligible: where the Proposed Development is unlikely to cause a noticeable change at a receptor, despite its level of sensitivity or there is a considerable change at a receptor which is not considered sensitive to a change. This effect is ‘Not Significant’.

4.2.52 In accordance with IAQM and EPUK guidance, ‘Minor’ and ‘Negligible’ level effects will be considered ‘Not Significant’, whilst ‘Moderate’ or ‘Major’ level effects will be considered to be potentially ‘Significant’. A statement will be made as to whether the level of effect is ‘Significant’ or ‘Not Significant’.

Human receptors – DMRB guidance

4.2.53 DMRB LA105 guidance² sets out magnitudes of change in annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} to categorise a significant effect for receptors where the concentration of a pollutant is within 10% of the relevant objective with the Proposed Development. The magnitude of change criteria is presented in **Table 4.7**.

Table 4.7: Magnitude of change criteria.

| Magnitude of Change in Concentration (µg.m ⁻³) | Value of Change in Annual Average NO ₂ and PM ₁₀ |
|--|--|
| Large (>4) | Greater than 10% of the air quality objective |
| Medium (>2-4) | Greater than 2µg.m ⁻³ but less than 10% of the objective (4µg.m ⁻³) |
| Small (>0.4 to 2) | Greater than 1% of the objective (0.4µg.m ⁻³) but less than 5% of the objective (2µg.m ⁻³) |
| Imperceptible (≤ 0.4) | Less than equal to 1% of the objective (0.4µg.m ⁻³) |

4.2.54 Where DMRB LA105² is applied, changes in pollutant concentrations greater than imperceptible ($0.4\mu\text{g.m}^{-3}$) at each receptor based on the Without Development versus With Development model results, will be compared with guideline bands that inform the potential significance of the impact of the Proposed Development. The guideline band ranges are presented in Error! Reference source not found. and provide the upper level of likely non-significance and the lower level of likely significance. Between these two levels are the ranges where likely significance is more uncertain, and greater onus is afforded to professional judgement.

Table 4.8: Guideline to number of properties constituting a significant effect.

| Magnitude of Change in Concentration ($\mu\text{g.m}^{-3}$) | Number of Receptors Demonstrating: | |
|---|--|--|
| | Worsening of air quality that already exceeds objective, risk of exceeding objective or creation of new exceedance | Improvement of air quality that already exceeds objective, risks of exceeding objective or the removal of existing exceedances |
| Large (>4) | 1 to 10 | 1 to 10 |
| Medium (>2 to 4) | 10 to 30 | 10 to 30 |
| Small (0.4 to 2) | 30 to 60 | 30 to 60 |

4.2.55 Significant air quality effects are only identified for those receptors where air quality thresholds are exceeded or at risk of being exceeded in the With Development scenarios. Whilst the approach contained within DMRB LA105² focuses on receptors already exceeding an annual mean air quality objective, or within 10% of exceeding an objective, guidance for determining the impact of the operational phase of the Proposed Development on each individual local air quality sensitive receptors is provided by the IAQM guidance as detailed in **Table 4.6**.

Ecological Designations

4.2.56 The NO_x concentrations predicted at the transect points within the ecological sites, will be compared to the relevant critical level, as detailed in **Table 4.5**, to determine any exceedances.

4.2.57 The level of nitrogen deposition calculated across the transect points within the ecological sites will be compared to the lower relevant critical load value to determine whether changes in nitrogen deposition were greater than 1% of the critical load. The results will then be referred to the appointed ecological consultants, to determine any potential impacts. Further details are provided in Chapter 6: Ecology including Arboriculture.

Limitations and Assumptions

4.2.58 There are uncertainties associated with both measured and predicted pollutant concentrations. The model (ADMS-Roads) used in this assessment relies on input data (including predicted traffic flows), which are also subject to uncertainty. The

model itself simplifies complex physical systems into a range of algorithms. In addition, local microclimatic conditions may affect the concentrations of pollutants that the ADMS-Roads model will not take into account.

- 4.2.59 The AQAL is based on traffic data provided by the project transport consultants. As such any assumptions made within the transport model are included within the Air Quality Assessment.
- 4.2.60 In future year scenarios, uncertainty relates to the projection of vehicle emissions and in particular, the rate at which emissions per vehicle will improve over time. The assessment to be included in the ES will utilise the most recent version of DEFRA's Emission Factors Toolkit to provide the most up to date estimate of current and future emission projections.
- 4.2.61 Current projections for vehicle emission factors are only available until 2030, which precedes the future year scenarios. A review will be undertaken at the time of finalising this chapter to identify whether further years of emission factors are available for use in air dispersion modelling. Where further years are not available for use, vehicle emission factors adopted for the future year will be based on 2030 emission factors, which is considered to be conservative.
- 4.2.62 To reduce uncertainty associated with predicted concentrations, model verification will be carried out following guidance set out in DEFRA guidance. As the models will be verified using local monitoring data from both the local authority and the project-specific monitoring programme, and adjusted accordingly, there can be reasonable confidence in the predicted concentrations.

4.3 POLICY CONTEXT

The UK air quality strategy

- 4.3.1 European Union (EU) legislation forms the basis of air quality policy and legislation in the UK. The EU 2008 ambient Air Quality Directive¹⁵ sets limits for ambient concentrations of air pollutants including nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}). The air quality standards and objectives are prescribed through the Air Quality (England) Regulations 2000¹⁶, as amended, for the purpose of the Local Air Quality Management Framework.

¹⁵ European Parliament (2008) Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe

¹⁶ HMSO (2000) Statutory Instrument 2000 No. 928, The Air Quality (England) Regulations 2000 (as amended), London: HMSO

- 4.3.2 The UK Government are required under the Environment Act 1995¹⁷ to produce a national Air Quality Strategy (AQS). The AQS was first published in 1997¹⁸ and was most recently reviewed and updated in 2007¹⁹. The AQS provides an overview of the Government's ambient air quality policy and sets out the air quality standards and objectives to be achieved and measures to improve air quality.
- 4.3.3 The Environment Act 2021²⁰ was granted Royal Assent in November 2021 and contains amendments to Part IV of the Environment Act 1995¹⁷ with regard to the Local Air Quality Management regime. Under the Environment Act 2021²⁰, the Secretary of State must lay a statement before Parliament setting out progress made in meeting air quality objectives and standard in England and steps taken towards achieving the standards. The Environment Act 2021²⁰ also places responsibility on local authorities to co-operate with air quality partners in the preparation of Air Quality Action Plans and identification of measures which should be monitored within the Plan and dates by which they should be implemented.
- 4.3.4 Part IV of the Environment Act¹⁷ requires local authorities in the UK to review local air quality within their administrative area and, if relevant air quality standards and objectives are likely to be exceeded, designate AQMAs. Following the designation of an AQMA, local authorities are required to publish an Air Quality Action Plan (AQAP) detailing measures to be taken to improve local air quality and work towards meeting the relevant air quality standards and objectives.

National Planning Policy Statement for National Networks

- 4.3.5 Paragraphs 5.3 to 5.15 of the National Planning Policy Statement for National Networks (NN NPS)²¹ provides guidance on generic air quality impacts and their assessment. Paragraph 5.7 of the NPS states that the ES should describe:
- existing air quality levels;
 - forecasts of air quality at the time of opening assuming that the scheme is not built (the future baseline) and taking account of the impact of the scheme; and
 - any significant air quality effects, their mitigation and any residual effects distinguishing between the construction and operation stages and taking into account of the impact of road traffic generated by the project.

National Planning Policy Framework

¹⁷ HMSO (1995) The Environment Act 1995, London: TSO

¹⁸ Department of the Environment (DoE) (1997) The UK National Air Quality Strategy, London: HMSO

¹⁹ Department of the Environment, Food and Rural Affairs (DEFRA) (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, London: HMSO

²⁰ HMSO (2021) The Environment Act 2021, London: TSO

²¹ Department for Transport (2014) National Planning Policy Statement for National Networks, HMSO London

4.3.6 The National Planning Policy Framework (NPPF)²² was amended in July 2021 and sets out the Government’s planning policies for England and how these are expected to be applied.

4.3.7 With regard to assessing cumulative effects the NPPF states in paragraph 185 that: *“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.”*

4.3.8 Paragraph 186 refers to compliance and relevant limit values and states:

“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”

4.3.9 The NPPF recognises air quality within Section 15: Conserving and enhancing the natural environment, and states in paragraph 174 that:

“Planning policies and decisions should contribute to and enhance the natural and local environment by:

- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;”*

Planning Practice Guidance

²² Ministry of Housing, Communities & Local Government (2019) National Planning Policy Framework, HMSO London

4.3.10 The Planning Practice Guidance (PPG) for air quality²³ was updated in November 2019 and provides guiding principles on how the planning process can take account of the impacts of new development on air quality.

4.3.11 The PPG²³ sets out the following with regard to air quality and planning:

- *“what air quality considerations does planning need to address;*
- *what is the role of plan-making with regard to air quality;*
- *air quality concerns relevant to neighbourhood planning;*
- *what information is available about air quality;*
- *when could air quality considerations be relevant to the development management process;*
- *what specific issues may need to be considered when assessing air quality impacts;*
- *how detailed does an air quality assessment need to be; and*
- *how can an impact on air quality be mitigated”.*

4.3.12 The PPG²³ (paragraph 001) sets out the pollutants for which there are legally binding limits for concentrations and those which the UK also has national emissions reduction commitments.

4.3.13 The PPG²³ (paragraph 002) states that development plans may need to consider:

- *“what are the observed trends shown by recent air quality monitoring data and what would happen to these trends in light of proposed development and / or allocations;*
- *the impact of point sources of air pollution (pollution that originates from one place);*
- *the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments, including their implications for vehicle emissions;*
- *ways in which new development could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example, entail identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable; and*
- *opportunities to improve air quality or mitigate impacts, such as through traffic and travel management and green infrastructure provision and enhancement”*

4.3.14 The PPG²³ (paragraph 006) also states what may be considered relevant to determining a planning application and these include whether a development would:

²³ Department for Communities and Local Government (2019) Planning Practice Guidance Air Quality

- *“lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
- *introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*
- *expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations; and*
- *have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value”.*

4.3.15 The PPG²³ (paragraph 008) provides guidance regarding what should be included within an air quality assessment. Examples of potential air quality mitigation measures are also provided.

Local Planning Policy

Adopted Cherwell Local Plan 2011 – 2031 Part 1

4.3.16 CDC adopted the Cherwell Local Plan in 2015²⁴. The Local Plan sets out the policies for determining development within the district. Policy ESD 10: Protection and Enhancement of Biodiversity and the Natural Environment states in relation to air quality:

“Protection and enhancement of biodiversity and the natural environment will be achieved by the following:

- *Air quality assessments will also be required for development proposals that would likely to have a significantly adverse impact on biodiversity by generating an increase in air pollution.”*

²⁴ Cherwell District Council (2015) The Adopted Cherwell Local Plan 2011 – 2031 (2015)

4.3.17 The above policies were taken into consideration throughout the undertaking of the assessment.

Air Quality Guidance

4.3.18 As discussed in the assessment methodology section, the following guidance will be used in the air quality assessment:

- Institute of Air Quality Management, Guidance on the assessment of dust from demolition and construction (2014)⁴;
- Highways England (HE), Design Manual for Roads and Bridges (DMRB) LA105 Air Quality guidance (2019)²;
- DEFRA, Local Air Quality Management Technical Guidance (LAQM TG(16)) (2021)⁵;
- Institute of Air Quality Management and Environmental Protection UK, Land-Use Planning and Development Control: Planning for Air Quality (2017)¹;
- Natural England, NEA001 Advising CAs on Road Traffic and HRA (2018)³; and
- Institute of Air Quality Management, A Guide to the Assessment of Air quality Impacts on Designated Nature Conservation Sites (2020)⁷

4.4 BASELINE CONDITIONS

4.4.1 This section will summarise the characteristics of the existing air quality conditions within the study area. At this stage, sufficient traffic data was not available to determine the extent of the study area and therefore, baseline conditions in the vicinity of the Proposed Development were considered. When the study area is determined diffusion tube monitoring data for each local authority within the study area will be detailed.

4.4.2 Principal air pollution sources in the vicinity of the Main Site are likely to comprise road traffic emissions, with the M40 motorway and other arterial roads located within the study area.

Local Air Quality Management

4.4.3 This section provides a summary of baseline conditions assessment across the CDC administrative area.

4.4.4 CDC declared four AQMAs for the potential exceedance of the NO₂ objective. These are:

- AQMA No. 1 - Hennef Way between the junctions with Ermont Way and Concorde Avenue;

- AQMA No. 2 - sections of Oxford Road, Bloxham Road, South Bar, High Street, Horsefair, North Bar, Warwick Road and Southam Road, Banbury;
- AQMA No. 3 - a section of Bicester Road, Kidlington to the north of its junction with Water Eaton Lane;
- AQMA No.4 - sections of Kings End, Queens Avenue, Field Street, St Johns Street, Bicester.

4.4.5 The Main Site is located within the administrative area of CDC. The Main Site is not located within, or in the vicinity of, any AQMAs. The nearest AQMA to the Main Site is the CDC AQMA No. 4 located 5km south east of the Main Site in Bicester.

4.4.6 The information contained in this section is correct at the time of writing.

Local Air Quality Monitoring

Nitrogen Dioxide – Local Authority Operated

4.4.7 CDC undertakes NO₂ monitoring at 41 locations within its administrative area. The closest monitoring location is Ardley B430, approximately 650m north of the Main Site.

4.4.8 NO₂ monitoring results for the locations in the vicinity of the Main Site are detailed in **Table 4.9** and Figure 4.1. These results have been bias adjusted to account for any discrepancies in the preparation method and laboratory utilised for analysis of diffusion tubes.

4.4.9 Monitored annual mean NO₂ concentrations indicate in the vicinity of the Main Site a downward trend in concentrations within the AQMAs and across the borough. Monitoring results for 2020 were not available. The IAQM released a position statement in August 2021 with regards to the use of 2020 and 2021 monitoring data and the COVID-19 pandemic. Until the impact of the pandemic on air quality is fully understood, the IAQM advice is to use 2019 monitoring data as the last typical year for monitoring data.

4.4.10 2019 monitoring results in the local vicinity showed no exceedances of the annual mean NO₂ objective.

Table 4.9: CDC NO₂ Monitoring Data in 2015 – 2019

| Location and Reference | Grid Reference | Site Monitoring Type | Distance from and direction to Main Site Boundary | Monitored Annual Average Concentration (µg.m ⁻³) | | | | |
|------------------------|----------------|----------------------|---|--|------|------|------|------|
| | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| | | | | | | | | |

| | | | | | | | | | |
|-----------------------------------|------------|------------|----------|-----------------------------|------|------|------|------|------|
| Ardley (B430) | 454 301 | 227 498 | Roadside | 650m north of the Main Site | 29.6 | 28.7 | 27.2 | 26.0 | 24.4 |
| Camp Road 2014 (Upper Heyford) | 451 448 | 225 779 | Kerbside | 800m west of the Main Site | 14.1 | 14.9 | 14.6 | 14.4 | 13.6 |
| Middleton 2014 (Middleton Stoney) | 453 397 | 223 516 | Kerbside | 800m south of the Main Site | 32.4 | 33.3 | 33.6 | 33.1 | 31.3 |

BWB Consulting Limited NO₂ Diffusion Tube Monitoring Survey

4.4.11 BWB Consulting Limited installed a project-specific NO₂ diffusion tube monitoring survey with locations in Upper Heyford, Ardley, Bicester, Middleton Stoney and Weston-on-the-Green. The monitoring types for each location were defined in accordance with DEFRA LAQM.TG16⁵. These monitoring locations will be utilised in model verification in addition to CDC monitoring data. The monitoring locations in this survey are detailed in **Table 4.10** and Figure 4.1 below and were provided to CDC prior to the start of the survey.

Table 4.10: BWB Consulting Ltd. NO₂ Diffusion Tube Monitoring Survey

| Site ID | Grid Reference (m) | | Height (m) | Monitoring Type |
|------------|--------------------|----------|------------|-----------------|
| MS 1,2,3 | 453393.4 | 223559.7 | 2.8 | Roadside |
| Ardley 3 | 454269.4 | 227369.9 | 2.2 | Roadside |
| Weston 1 | 453357.2 | 218710.7 | 2.3 | Roadside |
| Bicester 1 | 456320.2 | 222768.4 | 2.2 | Roadside |
| UH 2 | 451729 | 225722.3 | 2.2 | Roadside |
| Ardley 1 | 454296.9 | 227486.7 | 2.2 | Roadside |
| Ardley 2 | 454026.3 | 227454.6 | 2.3 | Roadside |
| UH 1 | 450803.4 | 225565.3 | 2.4 | Background |
| MS 4 | 453247.1 | 223561.1 | 2.3 | Background |

4.4.12 Annualisation of the NO₂ diffusion tube monitoring data collected will be undertaken in accordance with DEFRA LAQM.TG16⁵.

Figure 4.1: NO₂ Diffusion Tube Survey Monitoring Locations

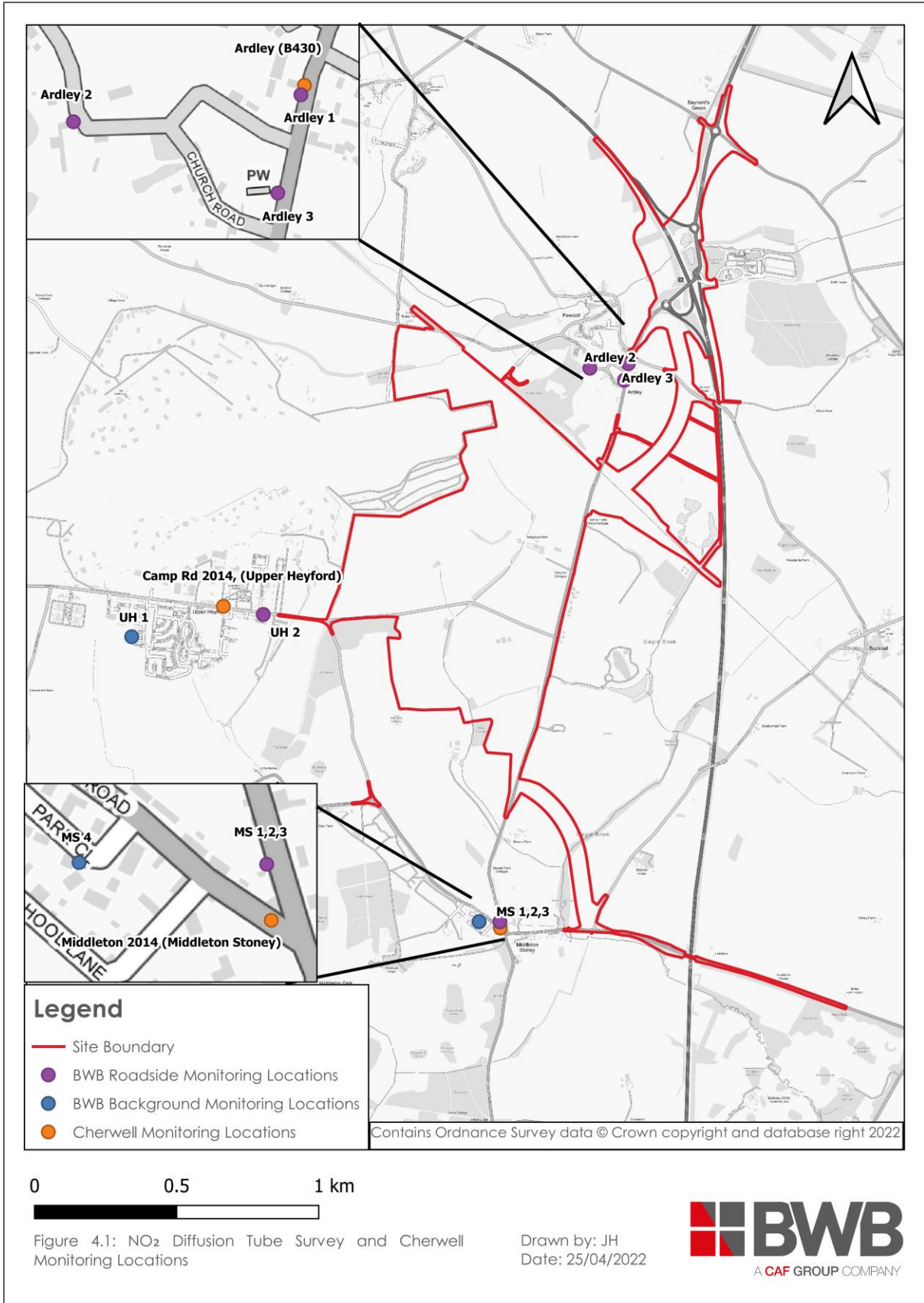


Figure 4.1: NO₂ Diffusion Tube Survey and Cherwell Monitoring Locations

Drawn by: JH
 Date: 25/04/2022

Particulate Matter (PM₁₀ and PM_{2.5})

- 4.4.13 CDC does not undertake any monitoring of PM₁₀ or PM_{2.5} within its administrative area.

Background Pollutant Concentrations

- 4.4.14 Background monitoring undertaken as part of the BWB Consulting Limited diffusion tube monitoring programme will be compared to the DEFRA background maps and assuming a reasonable correlation and sufficient data collection is achieved, will be utilised within the modelling to provide NO₂ background concentrations. The future year backgrounds will be calculated using the methodology provided in DEFRA LAQM.TG16⁵.
- 4.4.15 Background concentrations will be obtained from the latest DEFRA background²⁵ concentration maps, which are provided for the UK as a 1km by 1km grid network. The latest maps are based on 2018 monitoring and meteorological data. Predicted background concentrations of NO₂, NO_x, PM₁₀ and PM_{2.5} will be obtained for the grid squares covering the study area for the human and ecological receptors for the years of assessment.
- 4.4.16 The range of background concentrations for each pollutant and each assessment year will be detailed in this chapter, as well as full details of background concentrations used for each grid square.

Baseline and Future Baseline Conditions – air dispersion modelling

- 4.4.17 At this stage sufficient traffic data is not available to enable air dispersion modelling of existing and future baseline conditions to be undertaken. This will be undertaken in this chapter when finalised.

4.5 ASSESSMENT OF LIKELY EFFECTS

Construction Phase Dust Assessment

- 4.5.1 The construction phase of the Proposed Development will involve a number of activities which have the potential to impact on local air quality. These include emissions of dust generated through demolition, excavation, construction and trackout activities, exhaust pollutant emissions from construction traffic on the local

²⁵ DEFRA (2020) background pollutant concentration maps [<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2019>]

highway network, and exhaust emissions from non-road mobile machinery (NRMM) within the construction site itself.

- 4.5.2 The location of sensitive receptors in relation to construction activities will affect the potential for such construction activities to cause dust soiling, nuisance and local air quality impacts. Meteorological conditions and the use of control measures will also contribute to the effects experienced.
- 4.5.3 Steps 1 to 4 of the IAQM guidance⁴ will be followed in undertaking the construction phase dust assessment. Full details of the assessment undertaken will be provided in the ES chapter when finalised.

Operational Phase

- 4.5.4 At the time of writing this draft chapter, detailed traffic data was not available and therefore no detailed assessment of operational phase road traffic emissions was undertaken. This will be included in this chapter once detailed traffic data is available.

Rail Emissions

- 4.5.5 At the time of writing this draft chapter an assessment of the operational rail movements has not yet been undertaken available. The potential for rail emissions to influence local air quality will be considered in this chapter when finalised.

Odour Emissions

- 4.5.6 As part of the SRFI development proposals, the Severn Trent Green Power (STGP) waste facility will be relocated within the Application Site. Therefore, an odour assessment will be undertaken to determine the impact of the odour emissions associated with the relocation of the STGP waste facility, on the amenity of existing and proposed receptors. The ES Chapter will refer to the conclusions of the odour assessment which will be appended to the ES Chapter as a standalone report, once the assessment has been completed.

4.6 MITIGATION AND RESIDUAL EFFECTS

Construction Phase

- 4.6.1 A construction phase dust assessment will be carried out in due course and included in the next iteration of this draft chapter, and appropriate mitigation measures will be detailed when the outcome of this assessment is known. These mitigation measures will be included within the CEMP, and a CEMP will be submitted as part of the ES.

Operational Phase

- 4.6.2 As detailed traffic data was not available at the time of writing this draft chapter, the operational phase road traffic emissions assessment was not undertaken. This will be undertaken in due course and included in the next iteration of this draft chapter and the significance of any impacts determined in accordance with relevant guidance.

Residual Effects

Construction Phase Dust Assessment

- 4.6.3 The residual effects associated with construction phase dust will be considered in in due course and included in the next iteration of this draft chapter..

Operational Phase

- 4.6.4 The residual effects associated with operational phase road traffic emissions will be considered in due course and included in the next iteration of this draft chapter once detailed road traffic data is available.

4.7 CUMULATIVE EFFECTS

- 4.7.1 There are two types of cumulative effects:
- intra-project effects, combined effects from the Proposed Development on sensitive receptors such as dust, noise and visual effects; and
 - inter-project effects, the combined effects of the Proposed Development with other development site(s) which may be insignificant individually but combined can create a significant effect.

Construction phase

- 4.7.2 At the time of writing this draft chapter, sufficient information needed to conduct the construction phase dust assessment was not available and therefore was not undertaken. This will be included in this chapter when finalised and will include consideration of cumulative effects arising from the construction of the Proposed Development.

Operational phase

- 4.7.3 At the time of writing this draft chapter, detailed traffic data was not available and therefore the operational phase road traffic emission assessment was not undertaken. This will be included in this chapter when finalised and will include consideration of cumulative effects arising from concurrent operation of both the

Proposed Development and identified committed developments included in the traffic data provided by the Project Transport Consultant.

Climate Change

4.7.4 Climate change is caused by the emissions of greenhouse gases changing the general weather conditions prevailing over a long period of time. The impacts of climate change can therefore be considered in terms of volume of greenhouse gas emitted by the Proposed Development.

4.7.5 Climate Change is discussed in more detail in Chapter 15: Climate Change.

4.8 SUMMARY AND CONCLUSIONS

Construction Phase

4.8.1 At this stage, information needed for the construction phase dust assessment is not available. Conclusions from this assessment will be available in this chapter when finalised.

Operational Phase

4.8.2 At this stage, information needed for the operational phase road traffic emissions assessment is not available. Conclusions from this assessment will be available in this chapter when finalised.

Rail emissions

4.8.3 An assessment of the potential effects of rail emissions will be undertaken in this chapter when finalised in accordance with DEFRA guidance⁵ to determine if the impacts on local air quality from the operational development will be significant.