Botley West Solar Farm

Environmental Statement

Volume 1

Chapter 19: Air Quality

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Glossary

Term	Meaning
Annoyance (dust)	Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a legal nuisance.
AQMA	Air Quality Management Area, declared by a local authority where its review and assessment of air quality shows that an air quality objective is likely to be exceeded.
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.
Demolition	Any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time.
Deposited Dust	Dust that has settled out onto a surface after having been suspended in air
DMP	Dust Management Plan: a document that describes the site-specific methods to be used to control dust emissions.
Dust	Solid particles suspended in air or settled out onto a surface after having been suspended in air
Earthworks	Covers the processes of soil-stripping, ground-levelling, excavation, and landscaping.
The Applicant	SolarFive Ltd
The Project	The Botley West Solar Farm
Trackout	The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network

Abbreviations

Abbreviation	Meaning
AADT	Annual Average Daily Traffic Flow
ADMS	Atmospheric Dispersion Modelling System
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
CoCP	Code of Construction Practice
DCO	Development Consent Order
Defra	Department for Environment, Food & Rural Affairs
DMP	Dust Management Plan
EIA	Environmental Impact Assessment
ES	Environmental Statement

Abbreviation	Meaning
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NGET	National Grid Electricity Transmission
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
PEIR	Preliminary Environmental Information Report
PINS	The Planning Inspectorate
PM_{10}	Particulate matter with diameters of 10 micrometres or smaller
PV	Photovoltaic
PVDP	Photovolt Development Partners GmbH
R&A	Review and Assessment
TG	Technical Guidance
SSSI	Site of Special Scientific Interest

Units

Unit	Description
%	Percentage
km^2	Square kilometres
kWh	Kilowatt hour
MW	Megawatt
MWe	Megawatt electrical
MWh	Megawatt hour

19 Air Quality

19.1 Introduction

Overview

19.1.1 This chapter of the ES sets out the approach to the assessment of likely significant effects, of the Project, upon Historic Environment receptors. The application for development consent is being made to the Planning Inspectorate (PINS) under the Planning Act 2008. The proposal is to install and operate approximately 840MWe of solar generation in parts of West Oxfordshire, Cherwell and Vale of White Horse Districts, within the county of Oxfordshire (the Project).

19.1.2 This chapter of the Environmental Statement (ES) has been prepared by RPS for Photovolt Development Partners GmbH (PVDP) on behalf of SolarFive Ltd (the Applicant).

19.1.3 SolarFive is the 'special purpose vehicle' (SPV) for the Project and has been awarded a generation licence by Ofgem and offered a grid connection by National Grid Electricity Transmission (NGET) from October 2027. SolarFive is a licence holder under the Electricity Act 1989, and is also a company registered in England and Wales (company no. 12602740).

19.1.4 This ES has been prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, as amended (the 'EIA Regulations'), and other required documents including a statement on pre-application consultation.

19.1.5 This chapter has been prepared in accordance with the approach set out in the Scoping Report and subsequent Preliminary Environmental Information Report (PEIR).

19.1.6 The assessment presented is informed by the following technical chapters:

- Volume 1 - Chapter 12: Traffic and Transport **[EN010147/APP/6.3]**.

19.2 Legislative and Policy Context

Legislation

Air Quality Standards Regulations

19.2.1 The Air Quality Standards Regulations 2000 (2000 Regulations) and Air Quality Standards Regulations 2010 (2010 Regulations), amended by The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, set limit values for ambient air concentrations for the main air pollutants: particulate matter with diameters of 10 micrometres or smaller (PM_{10}), particulate matter with diameters of 2.5 micrometres or smaller ($PM_{2.5}$), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), lead (Pb) and benzene (C6H6), certain toxic heavy metals arsenic (As), cadmium (Cd), nickel (Ni) and polycyclic aromatic hydrocarbons (PAH).

19.2.2 These limit values are legally binding on the Secretary of State. The UK Government and devolved administrations operate various national ambient air quality monitoring networks to measure compliance and develop plans to meet the set limit values for the main air pollutants.

19.2.3 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 sets out an annual-mean $PM_{2.5}$ target of 10 $\mu g.m^{-3}$ to be met by the end of 2040. As the proposed opening year of the development is before 2040 this lower target has not been considered further.

The Environment Act

19.2.4 The Environment Act 1995, as amended by the Environment Act 2021, established the requirement for the Government and the devolved administrations to produce a National Air Quality Strategy for improving ambient air quality, the first being published in 1997 and having been revised several times since, with the latest published in 2023 (Department for Environment, Food & Rural Affairs (Defra), 2023).

19.2.5 The National Air Quality Strategy sets UK air quality standards and objectives for the pollutants in the 2010 Regulations plus 1,3-butadiene, and recognises that action at a national, regional and local level may be needed, depending on the scale and nature of the air quality problem. There is no legal requirement to meet objectives set within the UK Air Quality Strategy except where equivalent limit values are set within the 2010 Regulations.

19.2.6 The Environment Act 1995 also established the UK system of Local Air Quality Management (LAQM), that requires local authorities to go through a process of review and assessment of air quality in their areas, identifying places where objectives are not likely to be met, then declaring Air Quality Management Areas (AQMAs) and putting in place Air Quality Action Plans to improve air quality. These plans also contribute, at local level, to the achievement of the limit values in the 2010 Regulations.

19.2.7 The limit values and objectives relevant to this assessment are summarised in Table 19.1 of this chapter below. Where the limit values and the Air Quality Strategy (AQS) objectives differ, the more stringent objective/limit value has been used.

Table 19.1: Summary of relevant air quality limit values and objectives

Pollutant	Averaging Period	Objectives/Limit Values (micrograms per cubic metre, $\mu g.m^{-3}$)	Not to be exceeded more than
Nitrogen Dioxide (NO_2)	1 hour	200 $\mu g.m^{-3}$	18 times per calendar year
	Annual	40 $\mu g.m^{-3}$	-
Particulate Matter (PM_{10})	24 Hour	50 $\mu g.m^{-3}$	35 times per calendar year
	Annual	40 $\mu g.m^{-3}$	-
	Annual	20 $\mu g.m^{-3}$	-

Particulate Matter ($PM_{2.5}$)	10 $\mu g.m^{-3}$ to be met by 31 December 2040	-

19.2.8 On a construction site, dust emissions occur as a result of many different site activities and are typically fugitive (i.e. they cannot be collected and are not released under controlled physical conditions, e.g. emitted from a stack.) Air quality limit values and objectives are concentration-based values. Where emissions are not fugitive (i.e. they are controlled), they can be used in a model to predict pollutant concentrations. Those predictions can then be compared with air quality limit values and objectives to establish the likely significance of effect. As emissions from construction sites are fugitive, they cannot be modelled and a comparison with air quality limit values and objectives cannot be undertaken. Assessment methodologies for dust impacts during construction activities, focus on classifying the risk of dust impacts from a site, which then allows mitigation measures commensurate with that risk to be identified.

Planning policy context

National Policy Statements

19.2.9 There are currently six designated energy National Policy Statements (NPSs), EN-1, EN-2, EN-3, EN-4, EN-5 and EN-6. The 2023 revised NPSs (EN-1 to EN-5) came into force on 17 January 2024. The 2011 version of the NPS for Nuclear Power Generation (EN-6) remains in force. The Department for Energy Security and Net Zero (DESNZ) are in the process of preparing a new version.

19.2.10 **Table 19.2** sets out a summary of the policies within these NPSs, relevant to air quality.

Table 19.2: Summary of designated NPS document requirements relevant to this chapter

Summary of NPS Requirement	How and where considered in the ES
NPS EN-1	
'At the application stage of an energy NSIP, possible sources of nuisance under section 79(1) of the EPA 1990 and how they may be mitigated or limited should be identified by the applicant so that appropriate requirements can be included in any subsequent order granting development consent (see Section 5.7 on dust, odour, artificial light etc. and Section 5.12 on noise and vibration)' (paragraph 4.15.5 of NPS EN-1).	An assessment of dust generated during the construction and decommissioning phases is considered in **section 19.8** and **Section 19.10**. Mitigation measures are outlined in Table 19.35 This includes measures to control dust, during the construction phase, through a Dust Management Plan (DMP). The DMP would be developed in accordance with the Outline DMP within the Outline Code of Construction Practice **[EN010147/APP/7.6.1]**, which forms part of the application for development consent.
'At the application stage of an energy NSIP, possible sources of nuisance under section 79(1) of the EPA 1990 and how they may be mitigated or limited should be considered by the Secretary of State so that appropriate requirements can be included in any	

Summary of NPS Requirement	How and where considered in the ES
subsequent order granting development consent (see Section 5.7 on dust, odour, artificial light etc. and Section 5.12 on noise and vibration)' (paragraph 4.15.6 of NPS EN-1).	
'The Secretary of State should note that the defence of statutory authority is subject to any contrary provision made by the Secretary of State in any particular case in a Development Consent Order (section 158(3) of the Planning Act 2008). Therefore, subject to Section 5.7 and Section 5.12, the Secretary of State can disapply the defence of statutory authority, in whole or in part, in any particular case, but in so doing should have regard to whether any particular nuisance is an inevitable consequence of the development' (paragraph 4.15.7).	
NPS EN-1 includes generic guidance on the assessment of air quality impacts for major energy projects: *'Where the project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of the ES'* (paragraph 5.2.8 of NPS EN-1). This requires the Environmental Statement to describe: • '*existing air quality concentrations and the relative change in air quality from existing levels;* • *any significant air quality effects, mitigation action taken and any residual effects, distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;* • *the predicted absolute emissions, concentration change and absolute concentrations as a result of the proposed project, after mitigation methods have been applied; and* *any potential eutrophication impacts*.' (paragraph 5.2.9 of NPS EN-1).	The potential air quality impacts which may arise during construction and decommissioning of the Proposed Development have been described and considered within this chapter. This chapter focuses on the potential impacts from dust and emissions from traffic generated during construction and decommissioning of the Proposed Development (see **section 19.8** and **Section 19.10**.) and considers mitigation and residual effects. Mitigation measures provided as part of the Proposed Development are presented within section 19.7.
NPS EN-1 also states that: '*applicants should consider the Environment Targets (Fine Particulate Matter) (England) Regulations 2022 and associated Defra guidance'* (paragraph 5.2.10 of NPS EN-1).	Air quality targets are considered in section 19.2. Impacts on air quality are assessed in sections section 19.8 and Section 19.10.
'*The Secretary of State should consider whether mitigation measures are needed both for operational and construction emissions over and above any which may form part of the project application. A construction management*	Mitigation measures are outlined in Table 19.35**.** This includes measures to control dust, during the construction phase, through a Dust Management Plan (DMP). The DMP will be developed in accordance with the Outline DMP within the Outline Code of Construction Practice

Summary of NPS Requirement	How and where considered in the ES
plan may help codify mitigation at this stage. In doing so the Secretary of State should have regard to the Air Quality Strategy in England, or the Clean Air Plan for Wales in Wales, or any successors to these and should consider relevant advice within Local Air Quality Management guidance and PM2.5 targets guidance.' (paragraph 5.2.13 of NPS EN-1)	**[EN010147/APP/7.6.1]**, which forms part of the application for development consent.
'*Many activities involving air emissions are subject to pollution control. The considerations set out in Section 4.12 on the interface between planning and pollution control therefore apply. The Secretary of State must also consider duties under other legislation including duties under the Environment Act 2021 in relation to environmental targets and have regard to policies set out in the Government's Environmental Improvement Plan 2023*.' (paragraph 5.2.15 of NPS EN-1)	The air quality impacts during construction and decommissioning of the Proposed Development have been described and considered within this **section 19.8** and **section 19.10** of this chapter. Mitigation measures provided as part of the Proposed Development are presented within section 19.7. Impacts during the operation and maintenance phase are not likely and therefore have been scoped out, as detailed in Table 19.27 and outlined during the formal scoping process.
'*The Secretary of State should give air quality considerations substantial weight where a project would lead to a deterioration in air quality. This could for example include where an area breaches any national air quality limits or statutory air quality objectives. However, air quality considerations will also be important where substantial changes in air quality levels are expected, even if this does not lead to any breaches of statutory limits, objectives or targets*.' (paragraph 5.2.16 of NPS EN-1)	The air quality impacts during construction and decommissioning of the Proposed Development have been described and considered within this **section 19.8** and **section 19.10** of this chapter. With the mitigation measures provided as part of the Proposed Development presented within **section** 19.7**,** the impacts will be mitigated to a level that is not significant.
'*The Secretary of State should give air quality considerations substantial weight where a project is proposed near a sensitive receptor site, such as an education or healthcare facility, residential use or a sensitive or protected habitat*.' (paragraph 5.2.17 of NPS EN-1)	Sensitive receptors have been considered within the air quality assessment, as set out within Table 19.33.
'*Where a project is proposed near to a sensitive receptor site for air quality, if the applicant cannot provide justification for this location, and a suitable mitigation plan, the Secretary of State should refuse consent*.' (paragraph 5.2.18 of NPS EN-1)	Mitigation measures are outlined in Table 19.35. This includes measures to control dust, during the construction phase, through a Dust Management Plan (DMP). The DMP would be developed in accordance with the Outline DMP within the Outline Code of Construction Practice **[EN010147/APP/7.6.1]**, which forms part of the application for development consent.
'*In all cases, the Secretary of State must take account of any relevant statutory air quality limits, objectives and targets. If a project will lead to non-compliance with a statutory limit, objective or target the Secretary of State should refuse consent*.' (paragraph 5.2.19 of NPS EN-1)	The air quality impacts during construction and decommissioning of the Proposed Development have been described and considered within this **section 19.8** and **section 19.10** of this chapter. No statutory limit, objective or target has been exceeded.
'The applicant should assess the potential for insect infestation and emissions of odour, dust, steam, smoke, and artificial light to have a	An assessment of dust generated during the construction and decommissioning phases is considered in section 19.8 and section **19.10** respectively. Mitigation measures are detailed in Table 19.35.

Summary of NPS Requirement	How and where considered in the ES
detrimental impact on amenity, as part of the ES. *In particular, the assessment provided by the applicant should describe:* • *the type, quantity and timing of emissions* • *aspects of the development which may give rise to emissions* • *premises or locations that may be affected by the emissions* • *effects of the emission on identified premises or locations* • *measures to be employed in preventing or mitigating the emissions.'* *(paragraph 5.7.5 – 5.7.6 of NPS EN-1)*	As set out within Table 19.35, bonfires would be avoided during construction.
'The applicant is advised to consult the relevant local planning authority and, where appropriate, the EA about the scope and methodology of the assessment.' (paragraph 5.7.7 of NPS EN-1)	The consultation process and the responses received are outlined in section Table 19.6**.**
NPS EN-1 provides the following detail regarding mitigation, in relation to air quaility: *'Mitigation measures may include one or more of the following:* • *engineering: prevention of a specific emission at the point of generation; control, containment and abatement of emissions if generated* • *lay-out: adequate distance between source and sensitive receptors; reduced transport or handling of material* • *administrative: limiting operating times; restricting activities allowed on the site; implementing management plans* *Construction should be undertaken in a way that reduces emissions, for example the use of low emission mobile plant during the construction, and demolition phases as appropriate, and consideration should be given to making these mandatory in Development Consent Order requirements.* *Demolition considerations should be embedded into designs at the outset to enable demolition techniques to be adopted that remove the need for explosive demolition.* *A construction management plan may help clarify and secure mitigation.'* *(paragraphs 5.7.8 to 5.7.11 of NPS EN-1)*	Mitigation measures are outlined in Table 19.35. This includes measures to control dust, during the construction phase, through a Dust Management Plan (DMP). The DMP would be developed in accordance with the Outline DMP within the Outline Code of Construction Practice **[EN010147/APP/7.6.1],** which forms part of the application for development consent.
NPS EN-3	
EN-3 states that '*Where the exact location of the source of construction materials, such as crushed stone or concrete is not be known at*	This air quality assessment considers potential impacts of construction vehicle emissions on sensitive receptors

Summary of NPS Requirement	How and where considered in the ES
the time of the application, applicants should assess the worst-case impact of additional vehicles on the likely potential routes.' (EN-3 paragraph 2.10.124). This guidance applies to construction, including traffic and transport noise and vibration, but is considered to overlap with the air quality impact assessment.	located within the air quality study area (see section 19.8 and section **19.10**).

The National Planning Policy Framework

19.2.11 The National Planning Policy Framework (NPPF) was published in 2012 and updated in 2018, 2019, 2021 and twice in 2023 (Department for Levelling Up, Housing and Communities, 2023). The NPPF sets out the Government's planning policies for England.

19.2.12 **Table 19.3** sets out a summary of the NPPF policies relevant to this chapter.

Table 19.3: Summary of NPPF requirements relevant to this chapter

Policy	Key Provisions	How and where considered in the ES
Paragraph 8c	*'An environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution and mitigating and adapting to climate change, including moving to a low carbon economy'*	The air quality impacts during the construction and decommissioning phases of the project have been described and considered within section 19.8 of this chapter. The chapter sets out the mitigation proposed in section 19.7. Impacts during the operation and maintenance phase are not likely and have been scoped out, as outlined in Table 19.27 of this chapter.
Paragraph 109	'The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making'.	
Paragraph 180	'Planning policies and decisions should contribute to and enhance the natural and local environment by:…	
Paragraph 192	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; …'

19.2.13 The Planning Practice Guidance (PPG) (Department for Levelling Up, Housing and Communities, previously the Ministry of Housing, Communities and Local Government, 2023) supports the NPPF and provides guidance across a range of topic areas.

19.2.14 The Air Quality section of the PPG describes the circumstances when air quality, odour and dust can be a planning concern, requiring assessment.

19.2.15 The PPG advises that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations. This includes those relating to the conservation of habitats and species. Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity. The PPG states that when deciding whether air quality is relevant to a planning application, considerations could include the following.

- '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;
- 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;
- Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value.' (Paragraph 006, ID: 32-006-20191101)

19.2.16 The PPG provides advice on how air quality impacts can be mitigated and notes the following.

'Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is

important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met.' (Paragraph 008)

Local planning policy

19.2.17 The relevant local planning policies applicable to Air Quality based on the extent of the study areas for this assessment are summarised in **Table 19.4**.

Table 19.4: Summary of local planning policy relevant to this appendix

Policy	Key Provisions	How and where considered in the ES
Cherwell		
Policy ESD10: Protection and Enhancement of Biodiversity and the Natural Environment	*"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 be likely to have a significantly adverse impact on biodiversity by generating an increase in air pollution"*	The construction dust risk assessment in this appendix assesses the impacts on nearby ecology receptors and includes mitigation measures that would reduce impacts to a level that can be considered not significant. An assessment of impacts from construction traffic has been scoped out as the thresholds outlined in the IAQM guidance "A guide to the assessment of air quality impacts on designated nature conservation sites" (2020), which refers to threshold criteria of 1000 vehicles AADT or 200 HDV has not been met on any road links adjacent to ecological receptors (see Table 19.18).
West Oxfordshire		
POLICY EH8: Environmental protection	*"Air quality* *The air quality within West Oxfordshire will be managed and improved in line with National Air Quality Standards, the principles of best practice and the Air Quality Management Area Action Plans for Witney and Chipping Norton. Where appropriate, developments will need to be supported by an air quality assessment."*	An air quality assessment covering the impacts from the construction and decommissioning phase has been carried out in this chapter.
Vale of White Horse		
Core Policy 43: Natural Resources	*"The Council encourages developers to make provision for the effective use of natural resources where applicable, including: takes account of, and if located within an AQMA, is*	An air quality assessment covering the impacts from the construction and decommissioning phase has been carried out in this chapter.

consistent with, the Council's Air Quality Action Plan."

19.3 Consultation and Engagement

19.3.1 On 15 June 2023, the Applicants submitted a Scoping Report to the Planning Inspectorate, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases. It also described those topics or sub-topics which are proposed to be scoped out of the EIA process and provided justification as to why the Project would not have the potential to give rise to significant environmental effects in these areas.

19.3.2 Following consultation with the appropriate statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on 24 July 2023. Key issues raised during the scoping process specific to Air Quality are listed in **Table 19.5**, together with details of how these issues have been addressed within the ES.

Table 19.5: Summary of scoping responses

Comment	How and where considered in the ES
Planning Inspectorate	
The Scoping Report proposes that a desk-based study using the Department for Environment, Food and Rural Affairs (DEFRA) mapped estimates and results of local air quality monitoring will be undertaken to determine the existing air quality baseline of the site and surrounding area. No study area is determined, and surveys or modelling are not proposed. Construction and operational traffic movements will be considered against threshold criteria contained within EPUK/IAQM (2017) 'Land Use Planning & Development Control: Planning for Air Quality' guidance. The Scoping Report anticipates that movements will not exceed the threshold and a detailed assessment will not be required. The Scoping Report does not provide an indication of vehicle movements required during any phase of the development. The ES must provide a defined study area (based on the affected road network) and confirm the number of traffic movements during each phase of the Proposed Development, both alone and cumulatively with other proposals, to confirm that the relevant IAQM/EPUK thresholds are not exceeded. Subject to this confirmation, the Inspectorate agrees to scope out impacts to air quality from traffic movements.	The construction traffic generation estimates have changed since the Scoping Report was published. The latest construction traffic generation estimates do exceed the threshold criteria contained within EPUK/IAQM (2017) 'Land Use Planning & Development Control: Planning for Air Quality' guidance to require detailed modelling and has been considered further in section 19.8. Table 19.18 provides further detail in relation to the traffic data considered within this assessment.
Natural England	
1. Air quality in the UK has improved over recent decades but air pollution remains a	The IAQM guidance "A guide to the assessment of air quality impacts on designated nature conservation sites"

Comment	How and where considered in the ES
significant issue. For example, approximately 85% of protected nature conservation sites are currently in exceedance of nitrogen levels where harm is expected (critical load) and approximately 87% of sites exceed the level of ammonia where harm is expected for lower plants (critical level of 1µg) [1] . A priority action in the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The Government's Clean Air Strategy also has a number of targets to reduce emissions including to reduce damaging deposition of reactive forms of nitrogen by 17% over England's protected priority sensitive habitats by 2030, to reduce emissions of ammonia against the 2005 baseline by 16% by 2030 and to reduce emissions of NOx and SO2 against a 2005 baseline of 73% and 88% respectively by 2030. Shared Nitrogen Action Plans (SNAPs) have also been identified as a tool to reduce environmental damage from air pollution. The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly, or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts of air quality. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk). Natural England has produced guidance for public bodies to help assess the impacts of road traffic emissions to air quality capable of affecting European Sites. Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations - NEA001. Information on air pollution modelling, screening and assessment can be found on the following websites: – SCAIL Combustion and SCAIL Agriculture - http://www.scail.ceh.ac.uk/ – Ammonia assessment for agricultural development https://www.gov.uk/guidance/intensive-	(2020) refers to threshold criteria of 1000 vehicles AADT or 200 HDV to determine when detailed modelling is required. The results of the traffic and transport assessment (detailed in Volume 1 - Chapter 12: Traffic and Transport **[EN010147/APP/6.3]**) undertaken for this Proposed Development indicates that the IAQM thresholds for assessing nature conservation sites have not been exceeded. Therefore, construction-vehicle exhaust emissions on ecological sites have been scoped out. Table 19.18 provides further detail in relation to the traffic data considered within this assessment.

Comment	How and where considered in the ES
farming-risk-assessment-for-your-environmentalpermit – Environment Agency Screening Tool for industrial emissions https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmentalpermit – Defra Local Air Quality Management Area Tool (Industrial Emission Screening Tool) –England http://www.airqualityengland.co.uk/laqm	

19.3.3 Following scoping, consultation and engagement with interested parties specific to air quality has continued.

19.3.4 The PEIR was issued to inform the statutory consultation carried out on the Project between 30 November 2023 and 8 February 2024. It presented the preliminary findings of the EIA process for the Project at that time. The consultation responses specific to the Air Quality Chapter are set out below.

19.3.5 A summary of the key issues raised during consultation activities undertaken to date is presented in **Table 19.6**, together with how these issues have been considered in the production of this ES chapter.

Table 19.6: Summary of consultation relevant to this chapter

Date	Consultee and type of response	Issues Raised	How and where considered in the ES
08/02/24	UK Health Security Agency	Reducing public exposures to non-threshold pollutants (such as particulate matter and nitrogen dioxide) below air quality standards has potential public health benefits. We support approaches which minimise or mitigate public exposure to non-threshold air pollutants, address inequalities (in exposure), and maximise co-benefits (such as physical exercise) and encourage their consideration during development design, environmental and health impact assessment, and development consent.	A dust risk assessment and construction traffic emissions assessment has been undertaken (see section 19.8). Proportionate mitigation measures to the level of risk will be applied during construction (see Table 19.35) that will reduce dust impacts to a level that is insignificant.
08/02/24	Natural England	The 'Construction Traffic' paragraph of the HRA (4.4.10) acknowledges the need for an in-combination assessment of the traffic during construction and states that this will be presented in the Environmental Statement. Without this full in-combination assessment Natural England are not able to agree with the conclusions of the HRA. Air quality impacts should be carried through to stage 3 of the appropriate assessment.	The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality document (EPUK & IAQM, 2017) indicates that air quality assessments should include developments that increase annual average daily Heavy Duty Vehicle (HDV) traffic flows by more than 25 within or adjacent to an AQMA and more than 100 elsewhere. The IAQM guidance "A guide to the assessment of air quality impacts on designated nature conservation sites" (2020) refers to threshold criteria of 1000 vehicles AADT or 200 HDV. The results of the traffic and transport assessment (detailed in Volume 1 - Chapter 12: Traffic and Transport **[EN010147/APP/6.3]**) undertaken for this Proposed Development indicates that the aforementioned EPUK & IAQM thresholds are expected to be exceeded during the construction phase of this Proposed Development; however, the IAQM thresholds for assessing nature conservation sites have not been exceeded. Therefore, construction-vehicle exhaust emissions have been assessed specifically in section 19.8 for impacts on human health receptors but ecological impacts have been scoped out.

Date	Consultee and type of response	Issues Raised	How and where considered in the ES
08/02/24	Natural England	If there is potential for impacts to designated sites from pollution such as NOx, NH3, nitrogen deposition or acid deposition then this should be outlined in the next iteration of documentation. The assessment should be undertaken in line with Natural England's guidance NEA001. In the absence of access to the Air Quality Assessment we also provide the following advice: Further to the advice in NEA001, if it is determined that there are potential significant impacts from pollution associated with traffic then an assessment of ammonia impacts should also be undertaken. Ammonia emissions from road traffic could make a significant difference to nitrogen deposition close to roads. As traffic composition transitions toward more petrol and electric cars (i.e., fewer diesel cars on the road) – catalytic converters may aid in reducing NOx emissions but result in increased ammonia emissions – therefore consideration of the potential for impacts is needed (see here). There are currently two models which can be used to calculate the ammonia concentration and contribution to total N deposition from road sources. One of these models is publicly available and called CREAM, and there is another produced by National Highways.	The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality document (EPUK & IAQM, 2017) indicates that air quality assessments should include developments that increase annual average daily Heavy Duty Vehicle (HDV) traffic flows by more than 25 within or adjacent to an AQMA and more than 100 elsewhere. The IAQM guidance "A guide to the assessment of air quality impacts on designated nature conservation sites" (2020) refers to threshold criteria of 1000 vehicles AADT or 200 HDV. The results of the traffic and transport assessment (detailed in Volume 1 - Chapter 12: Traffic and Transport **[EN010147/APP/6.3]**) undertaken for this Proposed Development indicates that the aforementioned EPUK & IAQM thresholds are expected to be exceeded during the construction phase of this Proposed Development; however, the IAQM thresholds for assessing nature conservation sites have not been exceeded. Therefore, construction-vehicle exhaust emissions have been assessed specifically in section 19.7 of this chapter for impacts on human health receptors but ecological receptors have been scoped out.

19.4 Assessment Methodology

Overview

19.4.1 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor. This section describes the criteria applied in this chapter to assign values to the magnitude of impacts and the sensitivity of the receptors.

19.4.2 The terms used to define magnitude and sensitivity for the assessment of dust effects are based on those which are described in the IAQM Guidance on the assessment of dust from demolition and construction (IAQM, 2024). This is because the IAQM guidance has specific definitions and criteria when describing magnitude and sensitivity. These are then used to determine the risk of dust impacts.

19.4.3 Similarly, for traffic emissions, the EPUK and IAQM Land-Use Planning & Development Control: Planning for Air Quality guidance document (EPUK and IAQM, 2017) provides specific significance criteria that have been used to inform the assessment of effects on air quality from traffic emissions (thresholds outlined in section 19.4.27).

19.4.4 The following durations are used throughout this chapter:

- short term: a period of months, up to one year;
- medium term: a period of more than one year, up to five years; or
- long term: a period of greater than five years.

Dust

19.4.5 Dust is the generic term used to describe particulate matter in the size range 1-75 µm in diameter (BSI, 1983). Particles greater than 75 µm in diameter are termed grit rather than dust. Dusts can contain a wide range of particles of different sizes. The normal fate of suspended (i.e. airborne) dust is deposition. The rate of deposition depends largely on the size of the particle and its density; together these influence the aerodynamic and gravitational effects that determine the distance it travels and how long it stays suspended in the air before it settles out onto a surface. In addition, some particles may agglomerate to become fewer, larger particles; whilst others react chemically.

19.4.6 The effects of dust are linked to particle size and two main categories are usually considered:

- Dust, generally considered to be particles larger than 10 µm which fall out of the air quite quickly and can soil surfaces (e.g. a car, window-sill, laundry). Additionally, dust can potentially have adverse effects on vegetation and fauna at sensitive habitat sites (Table 19.37 details the sensitivity of the surrounding area to earthworks and construction and Table 19.38 details the sensitivity of the surrounding area to trackout).
- Particles emitted during construction activities are likely to be in the coarse fraction to the extent that the IAQM guidance advocates a method

that only considers the coarse fraction (i.e. the subset of PM_{10} that are greater than 2.5 microns in diameter. PM_{10}).

19.4.7 The IAQM guidance states that *"experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality and in the vast majority of cases they will not need to be quantitatively assessed."*

19.4.8 Furthermore, Local Air Quality Management Technical Guidance 22 (LAQM.TG(22)) states that *"experience of assessing the exhaust emissions from on-site plant (NRMM) and site traffic suggests that, with suitable controls and site management, they are unlikely to make a significant impact on local air quality. In the vast majority of cases they will not need to be quantitatively assessed…"* Therefore, emissions from NRMM have not been considered further in this assessment.

19.4.9 Examples of suitable measures include:

- Ensure all equipment complies with appropriate NRMM standards;
- Where feasible, ensure further abatement plant is installed on NRMM equipment, e.g. Diesel Particulate Filters;
- Ensure all vehicles switch off engines when stationary – no idling vehicles;
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible; and
- Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

Approach

19.4.10 The Institute of Air Quality Management (IAQM) guidance on the assessment of dust from demolition and construction (IAQM, 2024) (referred to hereafter as the IAQM dust guidance) sets out 250 m as the distance from the site boundary and 50 m from the site traffic route(s) up to 250 m of the entrance, within which there could potentially be nuisance dust and PM_{10} effects on human receptors. For sensitive ecological receptors, the corresponding distances are 50 m in both cases.

19.4.11 No statutory or official numerical air quality criterion for dust annoyance has been set at a UK, European or World Health Organisation (WHO) level. Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level.

19.4.12 The IAQM dust guidance aims to estimate the impacts of both PM_{10} and dust through a risk-based assessment procedure. The IAQM dust guidance document states: "The impacts depend on the mitigation measures adopted. Therefore the emphasis in this document is on classifying the risk of dust

impacts from a site, which will then allow mitigation measures commensurate with that risk to be identified."

19.4.13 The IAQM dust guidance provides a methodological framework, but notes that professional judgement is required to assess effects: "This is necessary, because the diverse range of projects that are likely to be subject to dust impact assessment means that it is not possible to be prescriptive as to how to assess the impacts. Also, a wide range of factors affect the amount of dust that may arise, and these are not readily quantified."

19.4.14 Consistent with the recommendations in the IAQM dust guidance, a risk-based assessment has been undertaken for the development, using the well-established source-pathway-receptor approach:

19.4.15 The dust impact (the change in dust levels attributable to the development activity) at a particular receptor will depend on the magnitude of the dust source and the effectiveness of the pathway (i.e. the route through the air) from source to receptor.

19.4.16 The effects of the dust are the results of these changes in dust levels on the exposed receptors, for example annoyance or adverse health effects. The effect experienced for a given exposure depends on the sensitivity of the particular receptor to dust. An assessment of the overall dust effect for the area as a whole has been made using professional judgement taking into account both the change in dust levels (as indicated by the Dust Impact Risk for individual receptors) and the absolute dust levels, together with the sensitivities of local receptors and other relevant factors for the area.

19.4.17 The dust risk categories that have been determined for each of the four activities (demolition, earthworks, construction and dust that is tracked out on the wheels of vehicles, referred to as trackout in the IAQM dust guidance) have been used to define the appropriate site-specific mitigation measures based on those described in the IAQM dust guidance. The guidance states that provided the mitigation measures are successfully implemented; the resultant effects of the dust exposure will normally be 'not significant'.

19.4.18 Regarding exhaust emissions from construction-related vehicles (contractors' vehicles and HGVs, diggers, and other diesel-powered vehicles), these are unlikely to have a significant impact on local air quality (IAQM, 2024) except for large, long-term construction sites: the Environmental Protection UK (EPUK) & IAQM Land-Use Planning & Development Control: Planning For Air Quality document (EPUK and IAQM, 2017) indicates that air quality assessments should be undertaken for developments that increase annual average daily Heavy Duty Vehicle (HDV) traffic flows by more than 25 within or adjacent to an Air Quality Management Area (AQMA) and more than 100 elsewhere. The equivalent increase for Light Duty Vehicles (LDVs) is more than 100 within or adjacent to an Air Quality Management Area (AQMA) and more than 500 elsewhere. The nearest AQMAs are approximately1.9 km from the site and the construction traffic will pass through them, therefore the lower threshold criteria inside an AQMA apply. The results of the traffic and transport assessment undertaken for this Project indicates that the aforementioned EPUK & IAQM thresholds are expected to be exceeded during the construction

phase of this Project; therefore, construction-vehicle exhaust emissions have been assessed specifically.

19.4.19 This assessment does not consider the air quality impacts of dust from any contaminated land or buildings. Contaminated land is considered within Volume 1 - Chapter 11: Ground Conditions of the ES **[EN010147/APP/6.3]**.

Source

19.4.20 The IAQM dust guidance gives examples of the dust emission magnitudes for demolition, earthworks and construction activities and trackout. These example dust emission magnitudes are based on the site area, building volume, number of HDV movements generated by the activities and the materials used. These example magnitudes have been combined with details of the period of construction activities to provide the ranking for the source magnitude that is set out in Table 19.7.

Table 19.7: Risk Allocation – Source (Dust Emission Magnitude)

Features of the Source of Dust Emissions	Dust Emission Magnitude
Demolition - building over 75,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities > 12 m above ground level. **Earthworks** – total site area over 110,000 m^2, potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds > 6 m in height. **Construction** - total building volume over 75,000 m^3, activities include piling, on-site concrete batching, sand blasting. **Trackout –** over 50 HDV outwards movements in any one day, potentially dusty surface material (e.g. High clay content), unpaved road length > 100 m.	Large
Demolition - building between 12,000 to 75,000 m^3, potentially dusty construction material and demolition activities 6 - 12 m above ground level. **Earthworks** – total site area between 18,000 to 110,000 m^2, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 3 - 6 m in height. **Construction** - total building volume between 12,000 and 75,000 m^3, use of construction materials with high potential for dust release (e.g. concrete), on-site concrete batching. **Trackout** – 20 - 50 HDV outwards movements in any one day, moderately dusty surface material (e.g. High clay content), unpaved road length 50 – 100 m.	Medium
Demolition - building less than 12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities < 6 m above ground, demolition during winter months. **Earthworks** – total site area less than 18,000 m^2. Soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 3 m in height. **Construction** - total building volume below 12,000 m^3, use of construction materials with low potential for dust release (e.g. metal cladding or timber). **Trackout** – < 20 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.	Small

Pathway and Receptor – Sensitivity of the Area

19.4.21 Pathway means the route by which dust and particulate matter may be carried from the source to a receptor. The main factor affecting the pathway effectiveness is the distance from the receptor to the source. The orientation of the receptors to the source compared to the prevailing wind direction is a relevant risk factor for long-duration construction projects; however, short-term construction projects may be limited to a few months when the most frequent wind direction might be quite different, so adverse effects can potentially occur in any direction from the site.

19.4.22 As set out in the IAQM dust guidance, a number of attempts have been made to categorise receptors into high, medium and low sensitivity categories; however, there is no unified sensitivity classification scheme that covers the quite different potential effects on property, human health and ecological receptors.

19.4.23 Table 19.8 and Table 19.9 sets out the IAQM basis for categorising the sensitivity of people and property to dust and PM_{10} respectively. Table 19.10 sets out the basis for determining the sensitivity of ecological receptors to dust.

Table 19.8: Sensitivities of People and Property Receptors to Dust

Receptor	Sensitivity
Principles: - • Users can reasonably expect enjoyment of a high level of amenity; or • the appearance, aesthetics or value of their property would be diminished by soiling; and • the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods as part of the normal pattern of use of the land. Indicative Examples: - • Dwellings. • Museums and other culturally important collections. • Medium and long-term car parks and car showrooms.	High
Principles: - • Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or • the appearance, aesthetics or value of their property could be diminished by soiling; or • the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Indicative Examples: - • Parks. • Places of work.	Medium
Principles: - • the enjoyment of amenity would not reasonably be expected; or • there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or • there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.	Low

Table 19.9: Sensitivities of People and Property Receptors to PM_{10}

Features of the Source of Dust Emissions	Dust Emission Magnitude
Principles:- • Locations where members of the public are exposed over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM_{10}, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative Examples:- • Residential properties. • Schools, hospitals and residential care homes.	High
Principles:- • Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM_{10}, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative Examples:- • Office and shop workers (but generally excludes workers occupationally exposed to PM_{10} as protection is covered by Health and Safety at Work legislation).	Medium
Principles:- • Locations where human exposure is transient exposure. Indicative Examples:- • Public footpaths. • Playing fields, parks. • Shopping streets.	Low

Table 19.10: Sensitivities of Ecological Receptors to Dust

Features of the Source of Dust Emissions	Dust Emission Magnitude
Principles:- • Locations with an international or national designation and the designated features may be affected by dust soiling; or • locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. Indicative Examples:- • Special Area of Conservation (SAC) designated for acid heathlands adjacent to the demolition of a large site containing concrete (alkali) buildings or for the presence of lichen.	High
Principles:- • Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • locations with a national designation where the features may be affected by dust deposition. Indicative Examples:- • Site of Special Scientific Interest (SSSI) with dust sensitive features.	Medium

Features of the Source of Dust Emissions	Dust Emission Magnitude
Principles:- • Locations with a local designation where the features may be affected by dust deposition. Indicative Examples:- • A Local Nature Reserve with dust sensitive features	Low

19.4.24 The IAQM methodology combines consideration of the pathway and receptor to derive the 'sensitivity of the area'. Table 19.11, Table 19.12 and Table 19.13 show how the sensitivity of the area has been derived for this assessment.

Table 19.11: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of receptors [a]	Distance from the Source (m) [b] <20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout.

[a] The total number of receptors within the stated distance has been estimated. Only the highest level of area sensitivity from the table has been recorded.

[b] For trackout, the distances have been measured from the side of the roads used by construction traffic. The impact declines with

Table 19.12: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration [a]	Number of receptors [b,c]	Distance from the Source (m) [b] <20	<50	<100	<250
High	> 32 µg.m^{-3}	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28 - 32 µg.m^{-3}	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24 - 28 µg.m^{-3}	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	< 24 µg.m^{-3}	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentration [a]	Number of receptors [b,c]	Distance from the Source (m) [b] <20	<50	<100	<250
		1-10	Low	Low	Low	Low
Medium	> 32 µg.m^{-3}	>10	High	Medium	Low	Low
		1 – 10	Medium	Low	Low	Low
	28 – 32 µg.m^{-3}	> 10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	< 28 µg.m^{-3}	>1	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout and for each designated site.

[a] Only the highest level of area sensitivity has been recorded.

Table 19.13: Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m) [a] <20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout and for each designated site.

[a] Only the highest level of area sensitivity has been recorded.

19.4.25 The IAQM dust guidance lists the following additional factors that can potentially affect the sensitivity of the area and, where necessary, professional judgement has been used to adjust the sensitivity allocated to a particular area:

- any history of dust generating activities in the area;
- the likelihood of concurrent dust generating activity on nearby sites;
- any pre-existing screening between the source and the receptors;
- any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which the works will take place;
- any conclusions drawn from local topography;

- duration of the potential impact, as a receptor may become more sensitive over time; and
- any known specific receptor sensitivities which are considered go beyond the classifications given in the table above.

19.4.26 The matrices in Table 19.14, Table 19.15, Table 19.16 and Table 19.17 have been used to assign the risk for each activity to determine the level of mitigation that should be applied. For those cases where the risk category is 'negligible', no mitigation measures are required beyond those mandated by legislation.

Table 19.14: Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 19.15: Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 19.16: Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 19.17: Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Traffic

19.4.27 The EPUK and IAQM Land-Use Planning & Development Control: Planning for Air Quality guidance document (EPUK and IAQM, 2017) provides the following indicative threshold criteria for determining when an air quality assessment should be undertaken.

- Roads within an AQMA:
  - an increase in annual average daily Light Duty Vehicle (LDV) flows by more than 100; or
  - an increase in annual average daily HDV flows by more than 25.
- Roads outside of an AQMA:
  - an increase in annual average daily LDV flows by more than 500; or
  - an increase in annual average daily HDV flows by more than 100.

19.4.28 The EPUK and IAQM guidance document continues by stating that:

'If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects.'

19.4.29 Therefore, only roads links where the threshold criteria identified above are exceeded have been specifically assessed.

19.4.30 Volume 1 - Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** sets out the estimates of average daily construction vehicle movements during the construction phase of Botley West. Data is provided for the road links located within the traffic and transport study area, which are located outside, adjacent and within an AQMA. Therefore, both threshold criteria of 500 LDVs and 100 HDV flows outside of AQMAs and 100 LDVs and 25 HDVs within/adjacent to AQMAs apply. The without development traffic flows are inclusive of cumulative developments.

19.4.31 Taking the above information into account and based on the construction traffic flow estimates provided in Volume 1 - Chapter 12: Traffic and Transport **[EN010147/APP/6.3]** of the ES, only the following road links are assessed:

Table 19.18: Traffic data used within the assessment

Road ID Link	Road Link Name	Speed (kph)	Daily Two Way Vehicle Flow			
			Without Development (inclusive of cumulative developments)		With Development	
			LDV	HDV	LDV	HDV
L1	A4260 Banbury Road between Gate 6 / HDD Access 1.1 and B4027 (West)	97	10185	398	10205	523
L5	A4095 Upper Campsfield Road between A4260 Banbury Road and A44 Woodstock Road	80/97	9175	484	9216	609
L8	A44 Woodstock Road between A4095 and Langford Lane	50/113	22137	1197	22336	1322
L10	A44 Woodstock Road between Langford Lane and A4260 Frieze Way	80	21656	606	22248	731
L11	A44 between A4260 Frieze Way and A34	80	27525	1640	28149	1765
L12	A34 Northeast of A44 Woodstock Road	113	55876	11492	56154	11554
L13	A44 Woodstock Road between A34 and A40 Northern By Pass Road	32/48	30343	1921	30614	2046
L14	A40 between A44 Woodstock Road and Eynsham Road	48/64/97	21794	1333	21945	1458
L15	A40 to the West of Eynsham Road	97	23728	1433	23879	1558
L16a	Lower Road between A40 and Gate 18 / 138	97	6983	185	7003	310
L21	B4017 Cumnor Road between B4044 and Gate 1	32/64/97	2450	315	2460	440
L22	B4044 Eynsham Road between B4017 Cumnor Road and A420	48/80	9421	513	9441	638
L23	A420 between B4044 Eynsham Road and A34	113	26010	2551	26039	2676
L24	A34 Southeast of A420	80	62140	8363	62441	8426
L25	A34 between A420 and A44 Woodstock Road	80	67057	8803	67358	8866

19.4.32 Assessed links are shown in Figure 19.2: Modelled Road Links and Sensitive Receptors in Volume 2 of the ES **[EN010147/APP/6.4].**

19.4.33 In urban areas, pollutant concentrations are primarily determined by the balance between pollutant emissions that increase concentrations, and the ability of the atmosphere to reduce and remove pollutants by dispersion, advection, reaction and deposition. An atmospheric dispersion model is used as a practical way to simulate these complex processes; such a model requires a range of input data, which can include emissions rates, meteorological data and local topographical information.

19.4.34 The atmospheric pollutant concentrations in an urban area depend not only on local sources at a street scale, but also on the background pollutant level made up of the local urban-wide background, together with regional pollution and pollution from more remote sources brought in on the incoming air mass. This background contribution needs to be added to the fraction from the modelled sources and is usually obtained from measurements or estimates of urban background concentrations for the area in locations that are not directly affected by local emissions sources.

19.4.35 The ADMS-Roads model has been used in this assessment to predict the air quality impacts from changes in traffic on the local road network during construction. This is a version of the Atmospheric Dispersion Modelling System (ADMS), a formally validated model developed in the UK by Cambridge Environmental Research Consultants Ltd and widely used in the UK and internationally for regulatory purposes.

19.4.36 Modelling of the traffic generated has been undertaken using Defra's 2023 emission factor toolkit (version 12) which draws on emissions generated by the European Environment Agency (EEA) COPERT 5.6 emission calculation tool.

19.4.37 ADMS-Roads requires detailed meteorological data as an input. The most representative observing station for the region of the study area that supplies all the data in the required format is Brize Norton. Meteorological data from that station for 2023 have been used within the dispersion model.

19.4.38 The air quality assessment predicts the impacts at locations that could be sensitive to any changes. For assessing human health impacts, such sensitive receptors should be selected where the public is regularly present and likely to be exposed over the averaging period of the objective. LAQM.TG22 provides examples of exposure locations and these are summarised in Table 19.19.

Table 19.19: Examples of where air quality objectives apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual-mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties.

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
		Kerbside sites (as opposed to locations at the building's façades), or any other location where public exposure is expected to be short-term.
Daily-mean	All locations where the annual-mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building's façade), or any other location where public exposure is expected to be short-term.
Hourly-mean	All locations where the annual and 24-hour mean would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

19.4.39 Representative sensitive receptors for this assessment have been selected at properties where pollutant concentrations and/or changes in pollutant concentrations are anticipated to be greatest, as listed in Table 19.20.

Table 19.20: Modelled sensitive receptors

ID	Description	X	Y
Botley School	Botley School	448605	206292
Stanley Close	Residential Property	448896	205827
Yarnells Road	Residential Property	448992	205746
Southern-By-Pass Road 1	Residential Property	449050	205694
Southern-By-Pass Road 2	Residential Property	449308	205506
Seacourt Tower	Office Block	448710	206305
Collett Drive	Residential Property	448803	210024
Leonardo Royal Hotel	Hotel	449478	210221
Woodstock Road	Residential Property	449688	210264
Red Barn Farm/Trax	School/education Facility	449413	210721
Holiday Inn Oxford	Hotel	449467	210988
Hillcrest	Residential Property	449287	211065
Loop Farm Bungalow	Residential Property	449136	211197

ID	Description	X	Y
Couling Close	Residential Property	448975	211605
Queens Gate	Residential Property	449768	210203
Potential NPE 1	Development under construction – possibility of new human health exposure	449119	210432
Potential NPE 2		449249	210377
Potential NPE 3		449395	210292
Potential NPE 4		449500	210549
Banbury Road	Residential Property	446328	218819
Upper Campsfield Road	Residential Property	446345	216229
Wolsey Close	Residential Property	446497	215164
Cassington Road	Residential Property	448237	212238
Gravel Pits Lane	Residential Property	447711	212788
Sandy Lane	Residential Property	447471	213042
Fernhill Road	Residential Property	447090	213916
Eynsham Road	Residential Property	445101	210378
New Wintles Farm	Residential Property	443363	210597
Nobles Lane	Residential Property	447179	205938
Cumnor Road	Residential Property	445113	206998
Oakes Lane	Residential Property	445215	206654

19.4.40 The annual, daily and hourly-mean AQS objectives apply at the front and rear façades of all residential properties, hotels and at the schools. The daily and hourly-mean AQS objectives only, apply at the Seacourt Tower office block. The approaches used to predict the concentrations for these different averaging periods are described below.

Long-term pollutant predictions

19.4.41 Annual-mean NO_x $PM_{2.5}$ and PM_{10} concentrations have been predicted at representative sensitive receptors using ADMS-Roads, then added to relevant background concentrations. Primary NO in the NO_X emissions is converted to NO_2 to a degree determined by the availability of atmospheric oxidants locally and the strength of sunlight. For road traffic sources, annual-mean NO_2 concentrations have been derived from the modelled road-related annual-mean NO_x concentration using Defra's calculator (NO_X_to_NO_2_Calculation_V8.1(2020)).

Short-term pollutant predictions

19.4.42 In order to predict the likelihood of exceedances of the hourly-mean AQS objectives for NO_2 and the daily-mean AQS objective for PM_{10}, the following

relationships between the short term and the annual-mean values at each receptor have been considered.

Hourly-mean AQS objective for NO_2

19.4.43 Research undertaken in support of LAQM.TG22 has indicated that the hourly-mean limit value and objective for NO_2 is unlikely to be exceeded at a roadside location where the annual-mean NO_2 concentration is less than 60 $\mu g.m^{-3}$. The threshold of 60 $\mu g.m^{-3}$ NO_2 has been used as the guideline for considering a likely exceedance of the hourly-mean NO_2 objective.

Daily-mean AQS objective for PM_{10}

19.4.44 The number of exceedances of the daily-mean AQS objective for PM_{10} of 50 $\mu g.m^{-3}$ may be estimated using the relationship set out in LAQM.TG22:

19.4.45 Number of Exceedances of Daily Mean of 50 $\mu g.m^{-3}$ = -18.5 + 0.00145 * (Predicted Annual-mean PM_{10})^3 + (206/Predicted Annual-mean PM_{10} Concentration)

19.4.46 This relationship indicates that the daily-mean AQS objective for PM_{10} is likely to be met if the predicted annual-mean PM_{10} concentration is 31.8 $\mu g.m^{-3}$ or less.

19.4.47 The daily mean objective is therefore not considered further within this assessment if the annual-mean PM_{10} concentration is predicted to be less than 31.5 $\mu g.m^{-3}$.

Fugitive PM_{10} emissions

19.4.48 Transport PM_{10} emissions arise from both the tailpipe exhausts and from fugitive sources such as brake and tyre wear and re-suspended road dust. Improvements in vehicle technologies are reducing PM_{10} exhaust emissions; therefore, the relative importance of fugitive PM_{10} emissions is increasing. Current official vehicle emission factors for particulate matter include brake dust and tyre wear which studies suggest may account for approximately one-third of the total particulate emissions from road transport; but not re-suspended road dust (which remains unquantified.)

Significance criteria for effects on the local area

19.4.49 The EPUK and IAQM Land-Use Planning & Development Control: Planning For Air Quality document advises that:

'The significance of the effects arising from the impacts on air quality will depend on a number of factors and will need to be considered alongside the benefits of the development in question. Development under current planning policy is required to be sustainable and the definition of this includes social and economic dimensions, as well as environmental. Development brings opportunities for reducing emissions at a wider level through the use of more efficient technologies and better designed buildings, which could well displace emissions elsewhere, even if they increase at the development site.

Conversely, development can also have adverse consequences for air quality at a wider level through its effects on trip generation.'

19.4.50 When describing the air quality impact at a sensitive receptor, the change in magnitude of the concentration should be considered in the context of the absolute concentration at the sensitive receptor. Table 19.21 provides the EPUK and IAQM approach for describing the long-term air quality impacts at sensitive human-health receptors in the surrounding area.

Table 19.21: Impact descriptors for individual sensitive receptors

Long term average concentration at receptor in assessment year	Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75 % or less of AQAL	Negligible	Negligible	Slight	Moderate
76 -94 % of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102 % of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109 % of AQAL	Moderate	Moderate	Substantial	Substantial
110 % or more than AQAL	Moderate	Substantial	Substantial	Substantial

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, limit value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

2. The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as negligible.

3. The table is only designed to be used with annual mean concentrations.

4. Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.

5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.

6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.

7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

19.4.51 The human health impact descriptors above apply at individual receptors. The EPUK and IAQM guidance states that the impact descriptors '*are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it maybe that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances*.'

19.4.52 Professional judgement by a competent, suitably qualified professional is required to establish the significance associated with the consequence of the impacts. This judgement is likely to take into account the extent of the current and future population exposure to the impacts and the influence and/or validity of any assumptions adopted during the assessment process.

19.4.53 Vehicle movements generated during the decommissioning phase are not expected to exceed those during the construction phase since the removal of

materials does not need to be delicately transported and can be bulk loaded whilst some infrastructure will be retained in-situ. Given that some infrastructure will be left in-situ, this results in less transport requirement which results in fewer vehicle movements in comparison to the construction phase. Thus, it can be determined that the identification of significant effects resulting from traffic generated during the construction phase, would also apply to the decommissioning phase.

Uncertainty

19.4.54 All air quality assessment tools, whether models or monitoring measurements, have a degree of uncertainty associated with the results. The choices that the practitioner makes in setting up the model, choosing the input data, and selecting the baseline monitoring data will decide whether the final predicted impact should be considered a central estimate, or an estimate tending towards the upper bounds of the uncertainty range (i.e., tending towards worst-case).

19.4.55 The atmospheric dispersion model itself contributes some of this uncertainty, due to it being a simplified version of the real situation: it uses a sophisticated set of mathematical equations to approximate the complex physical and chemical atmospheric processes taking place as a pollutant is released and as it travels to a receptor. The predictive ability of even the best model is limited by how well the turbulent nature of the atmosphere can be represented.

19.4.56 Each of the data inputs for the model, listed earlier, will also have some uncertainty associated with them. Where it has been necessary to make assumptions, these have mainly been made towards the upper end of the uncertainty range informed by an analysis of relevant, available data.

19.4.57 The atmospheric dispersion model used for this assessment, ADMS Roads, has been validated by its supplier and is widely used by professionals in the UK and overseas. A site-specific verification (calibration) provides additional certainty and is particularly important when air quality levels are close to exceeding the objectives/limit values.

19.4.58 LAQM.TG22 requires that local authorities verify the results of any detailed modelling undertaken for the purposes of fulfilling their review and assessment reporting duties. Model verification refers to the checks that are carried out on model performance at a local level. Modelled concentrations are compared with the results of monitoring. Where there is a disparity between modelled and monitored concentrations, the first step is to review the appropriateness of the data inputs to determine whether the performance of the model can be improved. Once reasonable efforts have been made to reduce the uncertainties in the data inputs, an adjustment may be established and applied to reduce any remaining disparity between modelled and monitored concentrations. No adjustment factor is deemed necessary where the modelled concentrations are within 25% of the monitored concentrations.

19.4.59 For the verification and adjustment of NO_x/NO_2 concentrations for review and assessment reporting purposes, it is recommended that the comparison involves a combination of automatic and diffusion monitoring, rather than a single automatic monitor. This is to ensure any adjustment factor derived is

representative of all locations modelled and not unduly weighted towards the characteristics at a single site. Where only diffusion tubes are used for the model verification, the study should consider a broad spread of monitoring locations across the study area to provide sufficient information relating to the spatial variation in pollutant concentrations.

19.4.60 Local Authorities generally implement a broad spread of monitoring, particularly in areas that are known to be sensitive to changes in air quality. Consequently, Local Authorities are usually able to verify the models they use for review and assessment reporting purposes; however for individual developments, there is less likely to be a broad range of monitoring locations within the relevant study area. Notwithstanding this, a small number of monitoring locations have been identified within the study area and a model verification study has been undertaken for the proposed development.

19.4.61 The main components of uncertainty in the total predicted concentrations, made up of the background concentration and the modelled fraction, include those summarised in Table 19.22.

Table 19.22: Approaches to dealing with uncertainty used within the assessment

Concentration	Source of Uncertainty	Approach to Dealing with Uncertainty	Comments
Background Concentration	Characterisation of current baseline air quality conditions	The background concentration used within the assessment is the most conservative value from a comparison of measured and Defra mapped concentration estimate.	The background concentration is the major proportion of the total predicted concentration.
	Characterisation of future baseline air quality (i.e., the air quality conditions in the future assuming that the development does not proceed)	The future background concentration used in the assessment is the same as the current background concentration and no reduction has been assumed. This is a conservative assumption as, in reality, background concentrations are likely to reduce over time as cleaner vehicle technologies form an increasing proportion of the fleet.	The conservative assumptions adopted ensure that the background concentration used within the model contributes to the result being towards the top of the uncertainty range, rather than a central estimate.
Fraction from Modelled Sources	Traffic flow estimates	High growth assumptions have been used to develop the traffic dataset used within the model.	The modelled fraction is likely to contribute to the result being between a central estimate and the top of the uncertainty range.
	Traffic speed estimates	The average speed has been reduced in congested areas to take account of slow-moving and queuing traffic.	
	Road-related emission factors – projection to future years	The most recently published emission factors have been used within the modelling and these are based on the current and best understanding of the variation in emission factors in future years.	

Concentration	Source of Uncertainty	Approach to Dealing with Uncertainty	Comments
	Meteorological Data	Uncertainties arise from any differences between the conditions at the met station and the development site, and between the historical met years and the future years. These have been minimised by using meteorological data collated at a representative measuring site. The model has been run for a full year of meteorological conditions. This means that the conditions in 8,760 hours have been considered in the assessment.	
	Receptors	Receptor locations have been identified where concentrations are highest or where the greatest changes are expected.	
	Dispersion Modelling	The model predictions have been compared with monitored concentrations and the model is systematically over-predicting.	

19.4.62 The analysis of the component uncertainties indicates that, overall, the predicted total concentration is likely to be towards the top of the uncertainty range rather than being a central estimate. The actual concentrations that will be found when the development is operational are unlikely to be higher than those presented within this report and are more likely to be lower.

Model Verification

19.4.63 The approach to model verification that LAQM.TG22 recommends for local authorities when they carry out their LAQM duties is summarised above. For the verification and adjustment of NO_x/NO_2 concentrations, the guidance recommends that the comparison considers a broad spread of automatic and diffusion tube monitoring.

19.4.64 Oxford City Council and South Oxford Council both monitor roadside NO_2 concentrations passively using diffusion tubes at several locations in the vicinity of the Transmission Assets. Monitors BS16, VS19, VS21 and VS22 are located in the Botley AQMA but have not been used in the model verification as they are located behind fences and measured concentrations are therefore significantly lower than the concentrations measured at VS17, VS18, VS32 and TF35. By removing these monitoring locations from the model verification, the correction factor derived is higher and therefore the results of this assessment are conservative.

19.4.65 The concentrations monitored over recent years are provided in Table 19.23.

Table 19.23: Measured annual-mean NO_2 concentrations ($\mu g.m^{-3}$)

Monitoring Site	Local Authority	Measured Annual Mean NO_2 Concentrations ($\mu g.m^{-3}$)				
		2019	2020	2021	2022	2023
VS16	South Oxfordshire	-	-	-	-	36.2
VS17		80	50.9	55.1	53.7	49.5

Monitoring Site	Local Authority	Measured Annual Mean NO_2 Concentrations ($\mu g.m^{-3}$)				
		2019	2020	2021	2022	2023
VS18		35.2	22.3	24.7	25.5	22.2
VS19		33.3	22.2	22.6	24.4	21.1
VS20		73.7	44.7	48.3	50.5	45.6
VS21		32.2	20.4	22.2	24.2	19.9
VS22		31.4	20	21.7	21.9	21.7
VS32		44.3	27.8	29.4	32.2	29.8
TF2	Oxford City	-	-	-	13	14
TF3		-	-	-	25	21
TF35		-	-	-	57	42
TF36		-	-	-	36	29
TF37		-	-	-	42	26
DT29		26	20	21	21	18
DT71		40	28	28	27	-
DT83		27	20	21	17	17

19.4.66 The monitored annual-mean NO_x road contributions have been derived from the monitored annual-mean NO_2 concentrations using the LAQM.TG22 calculator. The monitored annual-mean NO_x road contributions have then been compared with the modelled annual-mean NO_x road contributions. This comparison is provided in Table 19.24 below.

Table 19.24: Comparison of monitored and modelled annual-mean road NOx contribution ($\mu g.m^{-3}$)

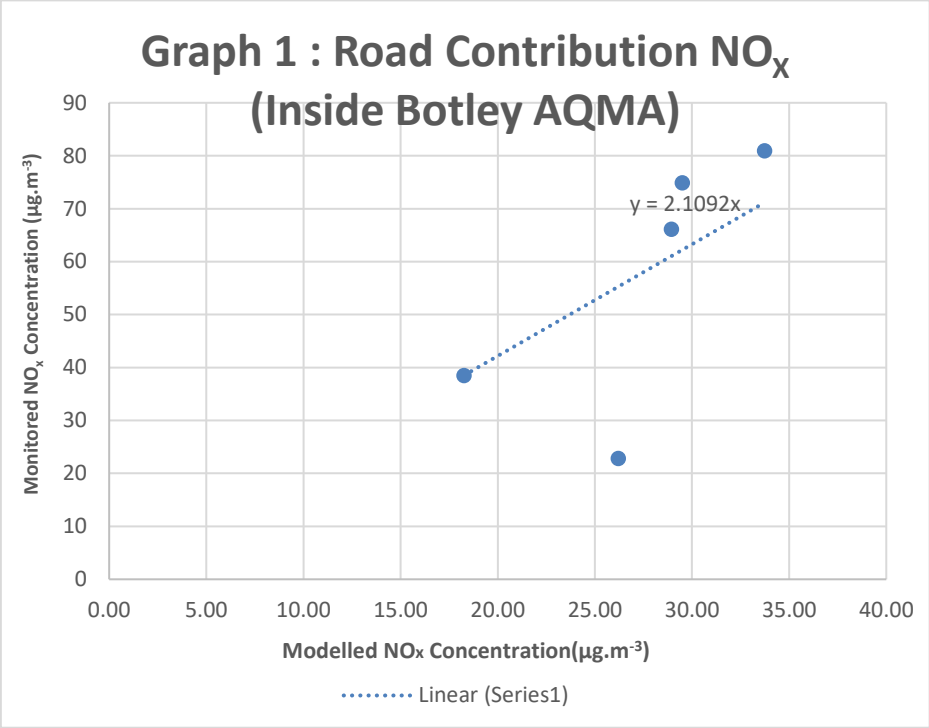
Monitoring Site	Location	Annual-mean Road NO_x Contribution ($\mu g.m^{-3}$)	
		Monitored	Modelled
VS17	Within Botley AQMA	80.94	33.73
VS18	Within Botley AQMA	22.82	26.20
VS20	Within Botley AQMA	74.88	29.50
VS32	Within Botley AQMA	38.49	18.26
TF35	Within Botley AQMA	66.11	28.94
TF2	Outside Botley AQMA	5.71	9.52

Monitoring Site	Location	Annual-mean Road NO_x Contribution ($\mu g.m^{-3}$)	
		Monitored	Modelled
TF3	Outside Botley AQMA	14.43	10.67
TF36	Outside Botley AQMA	33.96	41.18
TF37	Outside Botley AQMA	7.54	39.54
DT29	Outside Botley AQMA	25.31	7.01
DT71	Outside Botley AQMA	25.31	31.52
DT83	Outside Botley AQMA	33.9624.48	26.44

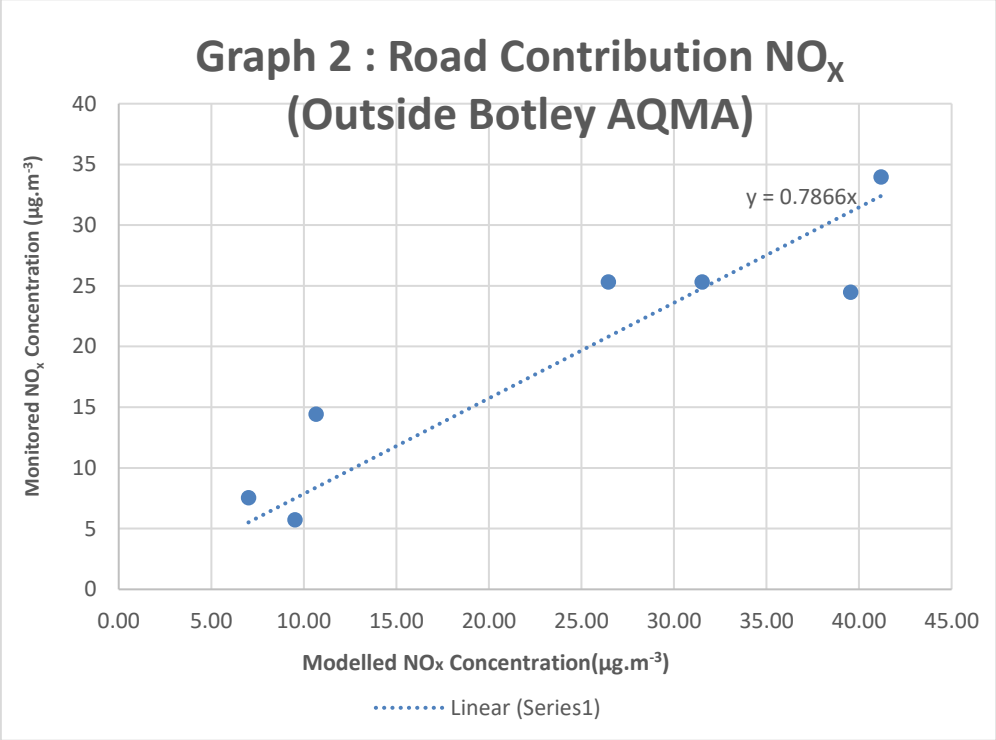
19.4.67 It should be borne in mind that the monitored concentrations are themselves only estimates to the true concentrations at each point; the EU Directive on air quality (Directive 2008/50/EC) designates passive NO_2 samplers indicative measures with a potential uncertainty of +/-30 %. Ignoring any uncertainty errors in the monitoring results, the table above indicates that the model is generally over-predicting at locations outside the Botley AQMA and under-predicting at locations within the Botley AQMA.

19.4.68 Modelled annual-mean NO_2 concentrations have been derived from the modelled annual-mean NO_x road contributions. The modelled annual-mean NO_2 concentrations have been plotted against the monitored annual-mean NO_2 concentrations in Graph 19.1 for locations within the Botley AQMA and in Graph 19.2 for locations outside Botley AQMA.

Graph 19.1: Comparison of Modelled and Monitored NOx Road Contribution – Inside Botley AQMA



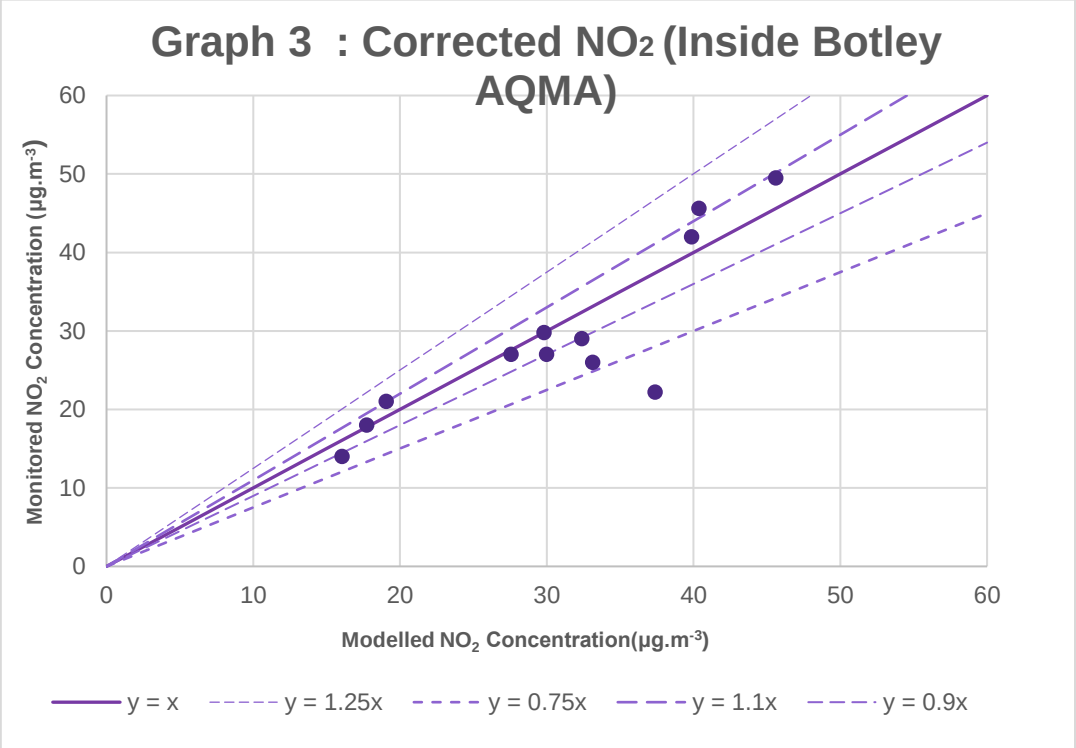
Graph 19.2: Comparison of Modelled and Monitored NOx Road Contribution – Inside Botley AQMA



19.4.69 For locations outside the Botley AQMA, no adjustment factor is considered necessary as the model is generally over-predicting. For locations within the Botley AQMA, the modelled NO_x contributions have been multiplied by the gradient of the trend line (2.1092) to determine the corrected NO_x

contributions. Modelled annual-mean NO_2 concentrations have been derived from the corrected modelled annual-mean NO_x road contributions. The corrected modelled annual-mean NO_2 concentrations have been plotted against the monitored annual-mean NO_2 concentrations in Graph 19.3.

Graph 19.3: Comparison of Corrected Modelled and Monitored NO_2 Concentrations – Inside Botley AQMA



19.4.70 The corrected modelled annual-mean NO_2 concentrations are mostly within 25% of the monitored annual-mean NO_2 concentrations. At one monitoring location, the model is over-predicting by more than 25%. The correction factor of 2.1092 therefore improves the modelled concentrations and has been applied to predictions used within the assessment for receptors within Botley AQMA. As outlined above, for locations outside of the Botley AQMA the model is over-predicting so no correction factor is considered necessary.

19.4.71 The fractional bias can also be used to determine whether the corrected model has a tendency to over or under-predict. The fractional bias is calculated as:

(Average Monitored NO_X Concentration – Average Predicted NO_X Concentration)/0.5 x (Average Monitored NO_X + Average Predicted NO_X Concentration)

19.4.72 Fractional bias values vary between +2 and -2 and has an ideal value of zero. A negative value suggests a model over-prediction and a positive value suggests a model under-prediction.

19.4.73 Table 19.25 sets out the average monitored concentration and the average predicted concentration.

Table 19.25: Comparison of monitored and adjusted modelled annual-mean road NOx contribution (µg.m^{-3})

Monitoring Site	Annual-mean Road NO_x Contribution (µg.m^{-3})	
	Monitored	Corrected Modelled
VS17	80.94	71.15
VS18	22.82	55.26
VS20	74.88	62.22
VS32	38.49	38.51
TF35	66.11	61.04
TF2	5.71	9.52
TF3	14.43	10.67
TF36	33.96	41.18
TF37	24.48	39.54
DT29	7.54	7.01
DT71	25.31	31.52
DT83	25.31	26.44
Average	35.00	37.84

19.4.74 The fractional bias for this study is therefore (35.0 – 37.84)/(0.5 x (35.0 + 37.84)) = 0.078. As the fractional bias is negative, the adjusted model is systematically over-predicting.

Assumptions and limitations of the assessment

19.4.75 The background PM_{10} concentration has been drawn from the highest measured concentration at the nearest background monitoring location. Whilst this does not provide a site-specific concentration, it provides a sufficient level of detail to enable the assessment of the impact risk arising from dust generated during construction of Botley West to be predicted robustly. This is because PM_{10} concentrations are relatively evenly distributed across the UK due to the wide range of sources and the contribution of secondary particulate matter.

19.4.76 Assumptions made for the modelling of traffic emissions are outlined in Table 19.22

Scope of the Assessment

19.4.77 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in **Table 19.5** and **Table 19.6**.

19.4.78 Taking into account the scoping and consultation process, **Table 19.26** summarises the issues considered as part of this assessment.

Table 19.26: Issues considered within this assessment

Activity	Potential effects scoped into the assessment
Construction Phase	
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite construction activities.	Activities required for the construction of the Proposed Development (e.g., earthworks, vehicle track-out) would generate dust emissions which could result in dust soiling effects on human receptors, including people and property.
The impact of increases in suspended particulate matter on human receptors arising from dust emissions generated by onsite construction activities.	Activities required for the construction of the Proposed Development (e.g., earthworks, vehicle track-out) would generate dust emissions which could result in adverse effects on the health of human receptors.
The impact on ecological receptors arising from dust emissions generated by onsite construction activities.	There are only two Sites of Special Scientific Interest (SSSIs) within study area (Blenheim Park and Wytham Woods SSSI)
The impact on human receptors arising from air emissions generated by vehicles during the construction phase.	The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality document (EPUK & IAQM, 2017) indicates that air quality assessments should include developments that increase annual average daily Heavy Duty Vehicle (HDV) traffic flows by more than 25 within or adjacent to an AQMA and more than 100 elsewhere. The results of the traffic and transport assessment (detailed in Volume 1 - Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]**) undertaken for this Proposed Development indicates that the aforementioned EPUK & IAQM thresholds are expected to be exceeded for individual roads during the construction phase of this Proposed Development
Decommissioning Phase	
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite decommissioning activities.	Activities required for the decommissioning of the Proposed Development (e.g., earthworks, vehicle track-out) would generate dust emissions which could result in dust soiling effects on human receptors, including people and property.
The impact of increases in suspended particulate matter on human receptors arising from dust emissions generated by onsite decommissioning activities.	Activities required for the decommissioning of the Proposed Development (e.g., earthworks, vehicle track-out) would generate dust emissions which could result in adverse effects on the health of human receptors.
The impact on ecological receptors arising from dust emissions generated by onsite decommissioning activities.	There are only two Sites of Special Scientific Interest (SSSIs) within study area (Blenheim Park and Wytham Woods SSSI)

19.4.79 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in **Table 19.27**.

Table 19.27: Issues scoped out of the assessment

Issue	Justification
Construction Phase	

Issue	Justification
The impact on ecological receptors arising from air emissions generated by vehicles during the construction phase.	The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality document (EPUK & IAQM, 2017) indicates that air quality assessments should include developments that increase annual average daily Light Duty Vehicle (LDV) traffic flows by more than 100 within or adjacent to an AQMA and more than 500 elsewhere. The IAQM guidance "A guide to the assessment of air quality impacts on designated nature conservation sites" (2020) refers to threshold criteria of 1000 vehicles AADT or 200 HDVs. The results of the traffic and transport assessment (detailed in Volume 1 - Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]**) undertaken for this Proposed Development indicates that the aforementioned EPUK & IAQM thresholds are not expected to be exceeded for any individual road during the construction phase of this Proposed Development; therefore, construction-vehicle exhaust emissions have not been assessed specifically. The EPUK & IAQM states that: *'If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects.'*
Operation and Maintenance Phase	
The impact on ecological receptors arising from air emissions generated by vehicles during the operation and maintenance phase.	The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality document (EPUK & IAQM, 2017) indicates that air quality assessments should include developments that increase annual average daily LDV traffic flows by more than 100 within or adjacent to an AQMA and more than 500 elsewhere. The IAQM guidance "A guide to the assessment of air quality impacts on designated nature conservation sites" (2020) refers to threshold criteria of 1000 vehicles AADT or 200 HDVs. The results of the traffic and transport assessment (detailed in detailed in Volume 1 - Chapter 12: Traffic and Transport **[EN010147/APP/6.3]**) undertaken for this Proposed Development indicates that the aforementioned EPUK & IAQM thresholds are not expected to be exceeded for any individual road during the operation and maintenance phase of this Proposed Development; therefore, operational-vehicle exhaust emissions have not been assessed specifically. The EPUK & IAQM states that: *'If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects.'*
The impact on human receptors arising from air emissions generated by vehicles during the operation and maintenance phase.	
The impact on human and ecological receptors (dust soiling and human health) arising from fugitive dust emissions generated during operation and maintenance of the Proposed Development.	Activities associated with the operation and maintenance of the Proposed Development are unlikely to generate dust. Therefore, the potential impact on human or ecological receptors arising from fugitive dust emissions generated during operation and maintenance of the Proposed Development is unlikely to result in significant effects and thus, has been scoped out of the assessment for air quality.
The impact on human and ecological receptors arising from air emissions generated by onsite combustion plant or stacks during operation and maintenance of the Proposed Development.	The Proposed Development does not include proposals for any plant or emission stacks which could give rise to air emissions during its operation. Therefore, potential impacts on human or ecological receptors arising from plant or stack emissions would not occur and, as such, would not result in significant effects and thus, has been scoped out of the assessment for air quality.
Decommissioning Phase	

Issue	Justification
The impact on ecological receptors arising from air emissions generated by vehicles during the decommissioning phase.	The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality document (EPUK & IAQM, 2017) indicates that air quality assessments should include developments that increase annual average daily LDV traffic flows by more than 100 within or adjacent to an AQMA and more than 500 elsewhere. The IAQM guidance "A guide to the assessment of air quality impacts on designated nature conservation sites" (2020) refers to threshold criteria of 1000 vehicles AADT or 200 HDV. The results of the traffic and transport assessment (detailed in detailed in Volume 1 - Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]**) undertaken for this Proposed Development indicates that the aforementioned EPUK & IAQM thresholds are not expected to be exceeded for any individual road during the decommissioning phase of this Proposed Development; therefore, operational-vehicle exhaust emissions have not been assessed specifically. The EPUK & IAQM states that: *'If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects.'*
The impact on human receptors arising from air emissions generated by vehicles during the decommissioning phase.	

Study area

19.4.80 The air quality study area is an area which is defined for each environmental topic which includes the Proposed Development Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected. For Air Quality, the study area is up to 250 m from the Proposed Development Order Limits.

19.4.81 Guidance on the assessment of dust from demolition and construction (IAQM, 2024) indicates that there could potentially be annoyance dust and particulate matter (PM) with diameters of 10 micrometres or smaller (PM_{10}) effects on human heath receptors located within 250 m of onsite construction activities and ecological receptors located within 50 m of onsite construction activities.

19.4.82 As such, the air quality study area has been defined with respect to construction dust and covers an area up to 250 m around the Proposed Development Order Limits, and 250 m from construction site entrances. In accordance with IAQM guidance (IAQM, 2024), receptors are also considered within 20 m, 50 m, 100 m, and 250 m in the air quality assessment.

19.4.83 To note, the study area used within this assessment differs from the study areas proposed within the PEIR chapter, as it has decreased from 350 m to 250 m. This reflects the updates made to the IAQM guidance in 2024 (IAQM, 2024).

19.4.84 For sensitive ecological receptors, the corresponding distances are 50 m in both cases. The Blenheim Park and Wytham Woods SSSIs are within 50 m of the Proposed Development Order Limits.

19.4.85 In accordance with the LAQM Technical Guidance (Defra, 2022), the assessment of traffic emissions includes all roads on which there is a significant change in traffic (over 25 HDVs or 100 LDVs in an area with an

AQMA or 100 HDVs or 500 LDVs outside an AQMA) This is the study area used during traffic modelling.

19.4.86 Multiple cable routes have been proposed (see Volume 1, Chapter 4 – Approach to Environmental Assessment) and all have been assessed as part of the construction dust risk assessment. The construction dust risk assessment uses the redline site boundary that encompasses all of the proposed routes, thus ensuring that the most conservative scenario is assessed.

19.4.87 The location and geographic extent of the study area used to inform the air quality assessment is presented in Figure 19.1: Site Boundary and Construction Dust Buffers in Volume 2 of the ES **[EN010147/APP/6.4]**.

19.5 Baseline Environment Conditions

Desk study

19.5.1 Information on air quality within the study area was collected through a detailed review of existing studies and datasets. These are summarised in **Table 19.28**.

Table 19.28: Summary of desk study sources used

Title	Source	Year	Author
Air Quality Annual Status Report	Cherwell District Council	2023	Cherwell District Council
Air Quality Annual Status Report	West Oxfordshire District Council	2023	West Oxfordshire District Council
Air Quality Annual Status Report	Vale of White Horse District Council	2023	Vale of White Horse District Council
Air Quality Annual Status Report	Oxford City Council	2024	Oxford City Council
Air Quality Annual Status Report	South Oxfordshire District Council	2024	South Oxfordshire District Council
Defra Background mapped	Defra	2018	Defra

Identification of designated sites

19.5.2 All designated sites within the study area and qualifying interest features that could be affected by the construction, operation and maintenance, and decommissioning phases of the Project are set out in **Table 19.29**.

Table 19.29: Designated sites and relevant qualifying interests

Designated site	Distance to the Project (nearest point)	Relevant qualifying interest
Botley AQMA	1.9 km	Air Quality Management Area
The City of Oxford AQMA	2.1 km	Air Quality Management Area
Blenheim Park SSSI	<50 m	Site of Special Scientific Interest

Designated site	Distance to the Project (nearest point)	Relevant qualifying interest
Wytham Woods	<50m	Site of Special Scientific Interest

Review and Assessment Process

19.5.3 Cherwell District Council has designated four AQMAs within the district. West Oxfordshire District Council has designated two AQMAs within the district. Vale of White Horse District Council has designated three AQMAs within the district and Oxford City Council has designated one AQMA. The nearest AQMA is the Botley AQMA, approximately 1.9 km from the site, encompassing a number of properties in Westminster Way, Coles Court, Stanley Close and along the Southern Bypass.

Local Urban Background Monitoring

19.5.4 Monitors at urban background locations measure concentrations away from the local influence of emission sources and are therefore broadly representative of residential areas within large conurbations. Monitoring at local urban background locations is considered an appropriate source of data for the purposes of describing baseline air quality for the Project site.

19.5.5 There are no local monitoring stations where urban background concentrations are measured using continuous automatic instruments in the districts of Cherwell, West Oxfordshire or Vale of White Horse.

19.5.6 The City of Oxford measures background concentrations using automatic instruments at the CM3 AURN St Ebbes location.

Table 19.30: Automatically Monitored Urban Background Annual-Mean Concentrations

Monitor Name	Distance from Site Boundary (km)	Pollutant	Concentrations (µg.m^{-3})				
			2019	2020	2021	2022	2023
CM3 AURN St Ebbes	4.2	NO_2	16	11	11	12	9
		PM_{10}	14	11	11	12	9
		$PM_{2.5}$	9	7	7	7	6

19.5.7 In addition, Oxford City Council and South Oxford District Council manually monitor NO_2 concentrations at a number of urban background locations using passive diffusion tubes and the most recently measured annual-mean concentrations are presented in Table 19.31.

Table 19.31: Passively Monitored Urban Background Annual-Mean NO_2 Concentrations

Monitor Code	Monitor Name	Distance from Site Boundary	Concentrations ($\mu g.m^{-3}$)				
			2019	2020	2021	2022	2023
VS23	Botley-Hutchcomb Rd	1.5	13.4	8	10	9	8.1
DT5	Lenthall Rd Allotments	6.2	14	10	11	10	8
VS31	Botley- St Swithuns Sch LP68	6.3	20	12	13.2	13.7	12.9
LT6	St Christophers school	7.5	-	-	13	12	10

Defra Mapped Concentrations

19.5.8 Defra's total annual-mean NO_2, PM_{10} and $PM_{2.5}$ concentration estimates have been collected for the 1 km grid square of the monitoring sites and PM_{10} and $PM_{2.5}$ concentration estimates have been collected for the 1 km grid squares (a total of 144 grid points were used) that the site passes through and are summarised in Table 19.32. Measured data for 2020 and 2021 have not been included in the range of concentrations due to impacts of the pandemic on air quality concentrations.

Table 19.32: Defra Mapped Annual-Mean Background Concentration Estimates

Site ID	Site Type	Range of Concentrations Measured ($\mu g.m^{-3}$)	Estimated Defra Mapped Concentration ($\mu g.m^{-3}$)
Application Site	PM_{10} (Defra Mapped 2018)	-	Maximum = 17.9 (occurs at 449500, 211500)
			Average = 14.8
	$PM_{2.5}$ (Defra Mapped 2018)		Maximum = 12.0 (occurs at 447500, 214500)
			Average = 9.6
CM3	Urban Background NO_2	9 – 16	15.9
	Urban Background PM_{10}	9 – 14	15.5
	Urban Background $PM_{2.5}$	6 – 9	10.5
VS23	Urban Background Diffusion Tube	8.1 – 13.4	12.3
DT5		8 – 14	16.2
VS31		12.9 – 20	14.1

Site ID	Site Type	Range of Concentrations Measured (µg.m^{-3})	Estimated Defra Mapped Concentration (µg.m^{-3})
LT6		10 – 12	16.4

Appropriate Background Concentrations for the Study Area

19.5.9 For NO_2, the Defra mapped background concentration estimates are generally within the range of results from monitoring. On that basis, the background NO_2 concentration used in the air quality assessment has been derived from the Defra mapped concentration at the modelled receptor.

19.5.10 For PM_{10}, to ensure the assessment is conservative, the background annual-mean PM_{10} concentration derived from the highest Defra mapped concentration of 17.9 µg.m^{-3} has been used for this assessment. For the purpose of the construction traffic modelling, the Defra mapped concentration at the modelled receptor has been used.

19.5.11 For $PM_{2.5}$, the background annual-mean $PM_{2.5}$ concentration derived from the Defra mapped concentration at the modelled receptors have been used for this assessment.

Future baseline conditions

19.5.12 Baseline pollutant concentrations are expected to reduce over time as cleaner, less polluting vehicle become a larger proportion of the fleet. For the purpose of this assessment and to remain conservative, no reduction is baseline concentrations have been applied.

19.5.13 With UK-wide initiatives such as those set out in the Clean Air Strategy, air quality is likely to improve over time. As such, to ensure that the assessment presents conservative results, no reduction in the background concentration has been assumed in future years.

19.5.14 The dispersion modelling of operational effects has been undertaken for one year of hourly meteorological conditions. The assessment therefore already takes into account a wide range of ambient temperatures and wind speeds. The assessment has been undertaken using the relevant technical guidance (LAQM.TG22) and based on current knowledge, the results of the assessment are not expected to be significantly influenced by climate change effects within the reasonably expected operational lifetime of the development.

Key receptors

19.5.15 Table 19.33 identifies the receptors taken forward into the assessment.

Table 19.33: Key receptors taken forward to assessment.

Receptor	Description	Sensitivity/value
Human health receptors within 250m of the Proposed Development Order Limits	Residential properties, schools, hospitals, care homes, places of work, public footpaths, playing fields, parks and shopping streets. sensitive to human health impacts	Low - High
Dust soiling receptors within 250m of the Proposed Development Order Limits	Residential properties, museums and other culturally important collections, medium and long term car parks, car showrooms, parks, places of work and playing fields, farm land (unless commercially-sensitive horticultural), footpaths, short term car parks and roads sensitive to dust soiling effects.	Low - High
Blenheim Park SSSI	An SSSI designated for ecological features	Medium
Wytham Woods SSSI	An SSSI designated for ecological features	Medium
Highway links identified within Volume 1 - Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]**.	Highway links on which there is a significant change in traffic (over 100 HDV or 500 LDV in an area without an AQMA and 25 HDVs or 100 LDVs within or adjacent to an AQMA) as a result of construction of the project.	High

19.6 Key Parameters for Assessment

Maximum design scenario

19.6.1 The maximum design scenarios identified in Table 19.34 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the Project Design Envelope provided in Volume 1, Chapter 6: Project Description of the ES **[EN010147/APP/6.3]**. Any other development scenario is considered to have less significant effects, based on details within the Project Design Envelope (e.g. different infrastructure layout), to that assessed here being taken forward in the final design scheme.

Table 19.34: Maximum design scenario considered for the assessment of potential impacts

Potential Impact Phase	Phase[a] C	O	D	Maximum Design Scenario	Justification
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite construction and decommissioning activities.	✓	×	✓	**Construction phase** **Solar PV modules** • Indicative number of solar PV modules is up to 2,200,000. • Indicative individual solar PV module dimensions – width 1.4m, length 2.40, depth 0.04m with an area up to 3.50m^2. • Minimum height of solar PV modules is 0.80m above ground level at lower the edge. • Maximum height of solar PV modules is 2.30m above ground level at the higher edge. • Maximum table width (including ridge break) is 22.00m. • Minimum distance north/south separation distance between tables is 1.50m • Minimum east/west separation distance between tables is 0.25m. • Minimum distance between fence boundary and table areas is 7.00m. • Indicative Total number of piles is up to 1,600,000. Indicative foundation type is driven piles or screw piles. The use of pre-cast concrete shoes may be used in areas of sensitive archaeology. • The maximum depth of piles below ground is 3.00m **Ancillary infrastructure** • The indicative number of power converter stations is 156 with maximum dimensions of 14.00m in length and 2.90m in width. • The indicative number of HV transformer stations (Secondary Substations) is 6 with maximum dimensions of 18.00m in length and 10m in width. • The indicative number of Applicant Substations is 1 with maximum dimensions of 156.00m in length and 63m in width. • The indicative number of NGET substations is 1 with a maximum site area requirement of 3.8ha.	The maximum design scenario presents the greatest area required for the construction of the proposed development; the greatest size of the temporary working areas; the movement of construction vehicles; and the longest duration of construction which represents the greatest potential for dust soiling generated by construction and decommissioning activities.
The impact of increases in suspended particulate matter on human receptors arising from dust emissions generated by onsite construction and decommissioning activities.	✓	×	✓		
The impact of increases in pollutants on human receptors arising from traffic emissions generated by construction traffic.	✓	×	✓		

Potential Impact Phase	Phase[a] C O D	Maximum Design Scenario	Justification
		HVAC cable route • The HVAC cable route is approximately 22 km long and runs from the Northern site to the Botley West substation. • Maximum number of transition joint bays to be constructed along the cable route is one every 600m • Excavations to install HVAC cables via trenched techniques will typically be 1.42m deep and 0.60m wide. • Maximum number of crossings to be undertaken via trenchless techniques (HDD or similar) is 11. HDD construction compounds are required at each entry and exit pit; dimensions for the entrance compound are 75.00m in length and 30.00m in width. Dimensions for the exit compound are 25.00m in length and 30.00m in width. • HDD construction compounds are to be served by temporary access roads approximately 5m wide. • The indicative number of temporary construction compounds is 4 with a maximum dimension of 200m in length and 200m in width. • Access tracks will not be permanently surfaced. During construction there may be a temporary need to lay terra-firma matting or similar in areas of high vehicle usage, on saturated ground and/or to avoid damage to soil structure. **Operation and maintenance phase** • The operation and maintenance phase involves the operation of infrastructure (solar PV modules and ancillary infrastructure) constructed within the construction phase. **Decommissioning phase** • Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).	

[a] C=construction, O=operational and maintenance, D=decommissioning

19.7 Mitigation and Enhancement Measures Adopted as Part of the Project

19.7.1 The design process for the Project has been heavily influenced by the findings of early environmental appraisals and the EIA process. The Project has had several measures incorporated into the design to avoid or minimise environmental impacts.

19.7.2 The key aspects where the design has evolved are described in ES Volume 1, Chapter 5: Alternatives Considered **[EN010147/APP/6.3]**. These include measures required for legal compliance, as well as measures that implement the requirements of good practice guidance documents. The assessment has been undertaken on the basis that these measures are incorporated in the design and construction practices (i.e. they are 'embedded mitigation').

19.7.3 Embedded mitigation measures for the construction phase are set out in the ES Volume 1, Chapter 6: Project Description **[EN010147/APP/6.3]**, Appendix 6.1: Project Mitigation Measures and Commitments Schedule **[EN010147/APP/6.5]** and the various management plans outlined in this chapter **[EN010147/APP/7.6]**.

19.7.4 Implementation of embedded mitigation relied upon in the assessment will be secured in the DCO, including by ensuring the works described in Schedule 1 of the DCO are restricted to their corresponding works areas shown on the Works Plans **[EN010147/APP/2.3]**, a DCO requirement requiring compliance of detailed design of the Project to accord with the Outline Design Principles **[EN010147/APP/7.7]**, or through specific DCO requirements requiring compliance with a management strategy, plan, or other requirement document.

19.7.5 Consideration has been given to any ‘additional mitigation’ over and above the embedded mitigation that may be required and has the potential to mitigate any significant adverse effects identified following the assessment of the Project inclusive of its embedded mitigation. Where significant effects remain following the implementation of embedded mitigation and achievable further measures could lower the identified effect, the topic chapter identifies additional mitigation and explains how the additional mitigation is secured, for example via a specific DCO requirement, via a management plan, or document secured by a DCO requirement like the Project Mitigation Measures and Commitments Schedule **[EN010147/APP/6.5]**.

19.7.6 To the extent any likely significant effects are anticipated following the assessment of the Project after the implementation of embedded and additional mitigation, each topic chapter will report these as residual effects. Residual effects for all topics are summarised in Chapter 21: Summary of Significant Environmental Effects of the ES **[EN010147/APP/6.3]**.

19.7.7 Where relevant, measures have also been identified that may result in enhancement of environmental conditions. Enhancement measures are not required to mitigate significant effects of the Project and are not factored into the determination of residual effects. They are further measures which would have additional beneficial outcomes should they be implemented.

19.7.8 Both embedded and additional mitigation measures relevant to this chapter are summarised in **Table 19.35**.

Table 19.35: Mitigation measures intended to be adopted as part of the Project

Commitment number	Measure adopted	How the measure will be secured
Embedded Mitigation		
19.1	Communications • Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. • Display the head or regional office contact information. • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM continuous monitoring and/or visual inspections.	These dust control measures would be included within the outline Code of Construction Practice (oCoCP) **[EN010147/APP/7.6.1]** and secured as a condition of the DCO.
19.2	Site Management • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book. • Hold regular liaison meetings with other high risk construction sites within 250m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	
19.3	Monitoring • Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within	

Commitment number	Measure adopted	How the measure will be secured
	100 m of the site boundary, with cleaning to be provided if necessary. • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked. • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. • Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	
19.4	<u>Preparing and Maintaining the Site</u> • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. • Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extended period. • Avoid site runoff of water or mud. • Keep site fencing, barriers and any scaffolding clean using wet methods. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. • Cover, seed or fence stockpiles to prevent wind whipping.	
19.5	<u>Operating Vehicle/Machinery and Sustainable Travel</u> • Ensure all vehicles switch off engines when stationary – no idling vehicles. • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. • Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the	

Commitment number	Measure adopted	How the measure will be secured
	approval of the nominated undertaker and with the agreement of the local authority, where appropriate). • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	
19.6	<u>Operations</u> • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. • Use enclosed chutes and conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	
19.7	<u>Waste Management</u> • Avoid bonfires and burning of waste materials.	
19.8	<u>High Risk Measures Specific to Earthworks</u> • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. • Only remove the cover in small areas during work and not all at once.	
19.9	<u>Medium Risk Measures Specific to Construction</u> • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	
19.10	<u>High Risk Measures Specific to Trackout</u> • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	

Commitment number	Measure adopted	How the measure will be secured
	• Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. • Record all inspections of haul routes and any subsequent action in a site log book. • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. • Access gates to be located at least 10m from receptors where possible.	

19.8 Assessment of effects

Dust

19.8.1 The type of activities that could cause fugitive dust emissions are: earthworks; handling and disposal of spoil; wind-blown particulate material from stockpiles; handling of loose construction materials; and movement of vehicles, both on and off site.

19.8.2 The level and distribution of construction dust emissions will vary according to factors such as the type of dust, duration and location of dust-generating activity, weather conditions and the effectiveness of suppression methods.

19.8.3 The main effect of any dust emissions, if not mitigated, could be annoyance due to soiling of surfaces, particularly windows, cars and laundry. However, it is normally possible, by implementation of proper control, to ensure that dust deposition does not give rise to significant adverse effects, although short-term events may occur (for example, due to technical failure or exceptional weather conditions). The following assessment, using the IAQM methodology, predicts the risk of dust impacts and the level of mitigation that is required to control the residual effects to a level that is “not significant”.

Risk of Dust Impacts

Source

19.8.4 There are no anticipated demolition works to take place. Therefore, demolition has not been considered further in this assessment.

19.8.5 The site area is greater than 110,000 m^2. Therefore, the dust emission magnitude for the earthworks phase is classified as large.

19.8.6 The total volume of the buildings to be constructed would be between 12,000m^3 and 75,000 m^3 and the dust emission magnitude for the construction phase is classified as medium.

19.8.7 At the peak of activity, the maximum number of daily outward HGV movements generated by the construction activity will be between 50 and 200. Assuming that the maximum number of outwards movements in any one day is greater than 50 HDVs, the dust emission magnitude for trackout would be classified as large.

Table 19.36: Dust Emission Magnitude for Earthworks, Construction and Trackout

Earthworks	Construction	Trackout
Large	Medium	Large

Pathway and Receptor – Sensitivity of the Area

19.8.8 All earthworks and construction activities are assumed to occur within the site boundary. As such, receptors at distances within 20 m, 50 m, 100 m and 250 m of the site boundary have been identified and are illustrated in Figure 19.1: Site Boundary and Construction Dust Buffers in Volume 2 of the ES **[EN010147/APP/6.4]**.The sensitivity of the area has been classified and the results are provided in Table 19.37 below.

Table 19.37: Sensitivity of the Surrounding Area for Earthworks and Construction

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	High	>100 high sensitivity receptors located within 20 m of the site boundary (Table 19.11)
Human Health	Medium	Background PM10 concentrations for the assessment = 17.9 µg.m-3 >100 high sensitivity receptors located within 20 m of the site boundary and PM10 concentrations below 24 µg.m-3 (Table 19.12).
Ecological	Medium	Blenheim Park and Wytham Woods SSSIs within 50 m of site boundary (Table 19.13)

19.8.9 The Dust Emission Magnitude for trackout is classified as large and trackout may occur on roads up to 250 m from the site. The sensitivity of the area has been classified and the results are provided in Table 19.38.

Table 19.38: Sensitivity of the Surrounding Area for Trackout

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	High	>100 high sensitivity receptors located within 20 m of the site boundary (Table 19.11)
Human Health	Medium	Background PM_{10} concentrations for the assessment = 17.9 $\mu g.m^{-3}$. >100 high sensitivity receptors located within 20 m of the site boundary and PM_{10} concentrations below 24 $\mu g.m^{-3}$ (Table 19.12).
Ecological	Medium	Blenheim Park and Wytham Woods SSSIs within 20m of roads used by construction traffic (Table 19.13)

Overall Risk

19.8.10 The Dust Emission Magnitude has been considered in the context of the Sensitivity of the Area to give the Dust Impact Risk. Table 19.39 summarises the Dust Impact Risk for the three activities.

Table 19.39: Dust Impact Risk for Earthworks, Construction and Trackout

Source	Earthworks	Construction	Trackout
Dust Soiling	High Risk	Medium Risk	High Risk
Human Health	Medium Risk	Medium Risk	Medium Risk
Ecology	Medium Risk	Medium Risk	Medium Risk
Overall Risk	High Risk	Medium Risk	High Risk

19.8.11 Taking the site as a whole, the overall risk of impacts on receptors from dust from earthworks, construction and trackout activities is deemed to be high without the implementation of appropriate mitigation measure. The mitigation measures appropriate to a level of risk for the site as a whole and for each of the phases are set out in section 19.7.

Construction Traffic

19.8.12 As set out in section 19.4.27, the EPUK and IAQM Land-Use Planning & Development Control: Planning for Air Quality guidance document (EPUK and IAQM, 2017) provides indicative threshold criteria for determining when an air quality assessment should be undertaken. The guidance document continues by stating that:

'If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects.'

19.8.13 Therefore, if the threshold criteria identified above are not exceeded on an individual road link, an assessment of construction-related vehicle movements need not be undertaken, and the effects can be considered not significant.

19.8.14 This section of the report summarises the construction phase air quality impacts of the key pollutants associated with the construction traffic.

Nitrogen Dioxide (NO_2)

19.8.15 Table 19.40 presents the annual-mean NO_2 concentrations predicted at the façades of existing receptors and at the potential new population exposure receptors.

Table 19.40: Predicted Annual-Mean NO_2 Impacts at Existing Receptors

Receptor ID	Concentration ($\mu g.m^{-3}$)		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Botley West	With Botley West		
Botley School	22.3	23.1	2	Negligible
Stanley Close	32.6	32.8	0	Negligible
Yarnells Road	26.4	26.5	0	Negligible
Southern-By-Pass Road 1	29.0	29.1	0	Negligible
Southern-By-Pass Road 2	23.1	23.1	0	Negligible
Seacourt Tower	22.6	23.1	1	Negligible
Collett Drive	17.8	17.8	0	Negligible
Leonardo Royal Hotel	20.0	20.1	0	Negligible
Woodstock Road	24.9	25.1	0	Negligible
Red Barn Farm/Trax	21.7	22.8	3	Negligible
Holiday Inn Oxford	27.1	27.7	2	Negligible
Hillcrest	20.0	20.3	1	Negligible
Loop Farm Bungalow	18.1	18.2	0	Negligible
Couling Close	15.3	15.4	0	Negligible
Queens Gate	22.6	22.8	0	Negligible
Potential NPE 1	24.6	24.9	1	Negligible
Potential NPE 2	21.5	21.7	0	Negligible
Potential NPE 3	21.2	21.3	0	Negligible
Potential NPE 4	21.2	21.5	1	Negligible

Receptor ID	Concentration (µg.m^{-3})		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Botley West	With Botley West		
Banbury Road	8.6	8.6	0	Negligible
Upper Campsfield Road	11.6	11.6	0	Negligible
Wolsey Close	13.8	13.8	0	Negligible
Cassington Road	13.9	14.0	0	Negligible
Gravel Pits Lane	13.3	13.4	0	Negligible
Sandy Lane	14.6	14.7	0	Negligible
Fernhill Road	14.3	14.4	0	Negligible
Eynsham Road	12.5	12.5	0	Negligible
New Wintles Farm	10.4	10.4	0	Negligible
Nobles Lane	11.5	11.5	0	Negligible
Cumnor Road	10.4	10.5	0	Negligible
Oakes Lane	10.1	10.1	0	Negligible
Maximum	**32.6**	**32.8**	**-**	**-**
Minimum	**8.6**	**8.6**	**-**	**-**

19.8.16 Predicted annual-mean NO_2 concentrations at the façades of the existing receptors are below the AQS objective for NO_2. When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor is 'negligible'.

19.8.17 As all predicted annual-mean NO_2 concentrations are below 60 µg.m^{-3} the hourly-mean objective for NO_2 is likely to be met at all receptors. The short-term NO_2 impact can be considered 'negligible' and is not considered further within this assessment.

19.8.18 Overall, the impact on the surrounding area from NO_2 is considered to be 'negligible', using the criteria adopted for this assessment and based on professional judgement.

Particulate Matter (PM_{10})

19.8.19 Table 19.41 presents the annual-mean PM_{10} concentrations predicted at the façades of existing receptors and at the potential new population exposure receptors.

Table 19.41: Predicted Annual-Mean PM_{10} Impacts at Existing Receptors

Receptor ID	Concentration ($\mu g.m^{-3}$)		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Botley West	With Botley West		
Botley School	19.5	19.8	1	Negligible
Stanley Close	22.7	22.8	0	Negligible
Yarnells Road	20.4	20.4	0	Negligible
Southern-By-Pass Road 1	21.1	21.2	0	Negligible
Southern-By-Pass Road 2	19.0	19.1	0	Negligible
Seacourt Tower	19.5	19.8	1	Negligible
Collett Drive	17.0	17.0	0	Negligible
Leonardo Royal Hotel	18.4	18.5	0	Negligible
Woodstock Road	20.0	20.0	0	Negligible
Red Barn Farm/Trax	18.9	19.3	1	Negligible
Holiday Inn Oxford	20.6	21.0	1	Negligible
Hillcrest	19.0	19.1	0	Negligible
Loop Farm Bungalow	18.3	18.4	0	Negligible
Couling Close	15.5	15.5	0	Negligible
Queens Gate	19.4	19.4	0	Negligible
Potential NPE 1	20.0	20.2	0	Negligible
Potential NPE 2	19.0	19.1	0	Negligible
Potential NPE 3	18.9	19.0	0	Negligible
Potential NPE 4	18.7	18.8	0	Negligible
Banbury Road	14.6	14.6	0	Negligible
Upper Campsfield Road	15.5	15.5	0	Negligible
Wolsey Close	15.7	15.7	0	Negligible
Cassington Road	16.0	16.0	0	Negligible
Gravel Pits Lane	16.4	16.4	0	Negligible
Sandy Lane	16.8	16.9	0	Negligible
Fernhill Road	16.7	16.7	0	Negligible

Receptor ID	Concentration (µg.m^{-3})		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Botley West	With Botley West		
Eynsham Road	15.6	15.6	0	Negligible
New Wintles Farm	15.4	15.4	0	Negligible
Nobles Lane	15.3	15.3	0	Negligible
Cumnor Road	14.6	14.6	0	Negligible
Oakes Lane	14.5	14.5	0	Negligible
Maximum	**22.7**	**22.8**	**-**	**-**
Minimum	**14.5**	**14.5**	**-**	**-**

19.8.20 Predicted annual-mean PM_{10} concentrations at the façades of the existing receptors are below the AQS objective for PM_{10}. When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor is 'negligible'.

19.8.21 As all predicted annual-mean PM_{10} concentrations are below 31.5 µg.m^{-3}, the hourly-mean objective for PM_{10} is likely to be met at all receptors. The short-term PM_{10} impact can be considered 'negligible' and is not considered further within this assessment.

19.8.22 Overall, the impact on the surrounding area from PM_{10} is considered to be 'negligible', using the criteria adopted for this assessment and based on professional judgement.

Particulate Matter ($PM_{2.5}$)

19.8.23 Table 19.42 presents the annual-mean PM_{10} concentrations predicted at the façades of existing receptors and at the potential new population exposure receptors.

Table 19.42: Predicted Annual-Mean $PM_{2.5}$ Impacts at Existing Receptors

Receptor ID	Concentration (µg.m^{-3})		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Botley West	With Botley West		
Botley School	12.4	12.6	1	Negligible
Stanley Close	14.7	14.7	0	Negligible
Yarnells Road	13.4	13.4	0	Negligible
Southern-By-Pass Road 1	13.5	13.5	0	Negligible
Southern-By-Pass Road 2	12.3	12.3	0	Negligible

Receptor ID	Concentration (µg.m^{-3})		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Botley West	With Botley West		
Seacourt Tower	12.4	12.6	1	Negligible
Collett Drive	10.9	10.9	0	Negligible
Leonardo Royal Hotel	11.7	11.7	0	Negligible
Woodstock Road	12.5	12.5	0	Negligible
Red Barn Farm/Trax	11.9	12.2	1	Negligible
Holiday Inn Oxford	12.9	13.1	1	Negligible
Hillcrest	11.8	11.8	0	Negligible
Loop Farm Bungalow	11.4	11.4	0	Negligible
Couling Close	10.1	10.2	0	Negligible
Queens Gate	12.2	12.2	0	Negligible
Potential NPE 1	12.6	12.7	0	Negligible
Potential NPE 2	12.0	12.0	0	Negligible
Potential NPE 3	12.0	12.0	0	Negligible
Potential NPE 4	11.8	11.9	0	Negligible
Banbury Road	9.3	9.3	0	Negligible
Upper Campsfield Road	9.8	9.9	0	Negligible
Wolsey Close	10.1	10.1	0	Negligible
Cassington Road	10.4	10.4	0	Negligible
Gravel Pits Lane	10.6	10.6	0	Negligible
Sandy Lane	10.8	10.8	0	Negligible
Fernhill Road	10.7	10.8	0	Negligible
Eynsham Road	10.1	10.2	0	Negligible
New Wintles Farm	9.9	9.9	0	Negligible
Nobles Lane	10.1	10.2	0	Negligible
Cumnor Road	9.5	9.5	0	Negligible
Oakes Lane	9.5	9.5	0	Negligible
Maximum	**14.7**	**14.7**	**-**	**-**
Minimum	**9.3**	**9.3**	**-**	**-**

19.8.24 Predicted annual-mean $PM_{2.5}$ concentrations at the façades of the existing receptors are below the AQS objective for $PM_{2.5}$. When the magnitude of

change is considered in the context of the absolute concentrations, the impact descriptor is ‘negligible’.

19.8.25 Overall, the impact on the surrounding area from $PM_{2.5}$ is considered to be ‘negligible’, using the criteria adopted for this assessment and based on professional judgement.

19.9 Cumulative Effects

19.9.1 The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Botley West Project together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 1, Chapter 19: Cumulative Effects and Inter-relationships). Each project has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

19.9.2 Cumulative dust effects are only likely to be significant for any sensitive receptors that are located within 250 m of both this construction activity and another dust-emitting activity being carried out at the same time.

19.9.3 The risk of dust impacts is best mitigated at source. Assuming that all developments implement dust mitigation and controls proportionate to the level of risk, there should be no residual cumulative air quality effect.

19.9.4 The air quality CEA methodology has followed the methodology set out in Volume 1, Chapter 4: Approach to Environmental Assessment. As part of the assessment, all projects and plans considered alongside the Project have been allocated into ‘tiers’ reflecting their current stage within the planning and development process.

- Tier 1
  - Under construction
  - Permitted application
  - Submitted application
  - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact
- Tier 2
  - Scoping report has been submitted
- Tier 3
  - Scoping report has not been submitted
  - Identified in the relevant Development Plan
  - Identified in other plans and programmes.

19.9.5 This assessment is followed by all other relevant projects, identified by tier.

19.9.6 This tiered approach is adopted to provide a clear assessment of the Project alongside other projects, plans and activities.

19.9.7 The specific projects, plans and activities scoped into the CEA, are outlined in Table 19.43. Projects, plans and activities used in the traffic data assessed are outlined in Volume 1 – Chapter 12: Traffic and Transport **[EN010147/APP/6.3]**.

19.9.8 The NGET substation has been assessed as part of the Project but alternatively it may be located adjacent to the Site. In this situation the land identified within the Site for the NGET substation would be developed with solar PV panels. The placement of the NGET substation outside the Order Limits could give rise to cumulative effects.

Table 19.43: List of other projects, plans and activities considered within the CEA

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
Tier 1						
20/01734/OUT Salt Cross Garden Village	Approved	Adjacent	2,200 dwellings and 40ha of employment land	Unknown	Unknown	Unknown
16/01364/OUT Land east of Woodstock	Permitted	Adjacent	300 residential dwellings, up to 1100sqm of A1/A2/B1/D1 floorspace;	Unknown	Unknown	Unknown
21/00217/OUT Land north of Banbury Road, Woodstock	Pending	0.2	235 dwellings with community space and car barns	Unknown	Unknown	Unknown
18/01009/RES Grove Road, Bladon	Under Construction	Adjacent	10 dwellings	Unknown	Unknown	Unknown
22/00108/CC3REG Eynsham Park and Ride and Science Transit	Permitted	Adjacent	A40 Dualling Witney to Eynsham Park & Ride as part of OCC Transport Plan	Unknown	Unknown	Unknown
20/01817/FUL Land Between Woodstock Sewage Works And B4027 - Solar Farm	Permitted	Adjacent	5MW generating capacity on 9.1ha of land	Unknown	Unknown	Unknown
22/03501/FUL Continued use of land for outdoor adventure camping	Refused	Adjacent	Adventure campsite (retrospective) - refused - assume use will cease or be enforced, but may return on a 28 day PD basis (APPEAL LODGED)	Unknown	Unknown	Unknown

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
22/03502/FUL Continued use of land for outdoor adventure camping	Refused	Adjacent	Adventure campsite (retrospective) - refused - assume use will cease or be enforced, but may return on a 28 day PD basis (APPEAL LODGED)	Unknown	Unknown	Unknown
14/0819/P/FP Solar Farm	Refused	Adjacent	7.5MW for 2,150 households - refused and dismissed at appeal (listed as Tier 1 - but not permitted)	Unknown	Unknown	Unknown
21/03522/OUT West of Rutten Lane Yarnton	Pending	Adjacent	The erection of up to 540 dwellings (Class C3), up to 9,000sqm GEA of elderly/extra care residential floorspace (Class C2), a Community Home Work Hub (up to 200sqm)(Class E), alongside the creation of two locally equipped areas for play, one NEAP, up to 1.8 hectares of playing pitches and amenity space for the William Fletcher Primary School, two vehicular access points, green infrastructure, areas of public open space, two community woodland areas, a local nature reserve, footpaths, tree planting, restoration of historic hedgerow, and associated works. All matters are reserved, save for the principal access points. (APPEAL LODGED)	Unknown	Unknown	Unknown
22/01715/OUT Land south of Perdiswell Farm, Shipton Road	Withdrawn	Adjacent	Erection of up to 500 dwellings with associated access, open space and infrastructure	Unknown	Unknown	Unknown
23/00517/F New Science Park West of junction with The	Pending	Adjacent	Redevelopment of the site to include the demolition of existing buildings and development of new accommodation across 5 buildings for employment uses (Class E(g)(ii) and (iii)) plus ancillary amenity building, outdoor			

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
Boulevard, Oxford Airport, Langford Lane			amenity space, car parking, cycle parking, landscaping and associated works			
23/02098/OUT Multi-phased residential-led mixed used development.		Adjacent	Up to 215,000 square metres gross external area of residential floorspace (or c.1,800 homes which depending on the housing mix could result in a higher or lower number of housing units) within Use Class C3/C4 and large houses of multiple occupation (Sui Generis); Supporting social infrastructure including secondary school/primary school(s) (Use Class F1); health, indoor sport and recreation, emergency and nursery facilities (Class E(d)-(f)). Supporting retail, leisure and community uses, including retail (Class E(a)), cafes and restaurants (Class E(b)), commercial and professional services (Class E(c)), a hotel (Use Class C1), local community uses (Class F2), and other local centre uses within a Sui Generis use including public houses, bars and drinking establishments (including with expanded food provision), hot food takeaways, venues for live music performance, theatre, and cinema. Up to 155,000 net additional square metres (gross external area) of flexible employment uses including research and development, office and workspace and associated uses (Use E(g)), industrial (Use Class B2) and storage (Use Class B8) in connection with the expansion of Begbroke Science Park; Highway works, including new vehicular, cyclist and pedestrian roads and paths			

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
P23/V2624/FUL Red House Farm Eynsham Road Farmoor Oxford OX2 9ND	Pending	Adjacent	Installation of ground mounted solar photovoltaic array with associated infrastructure, security fence, CCTV, cable route, landscaping, and onsite biodiversity net gain.	Unknown	Unknown	Unknown
Tier 2						
23/00080/PREAPP Data Centre, Forestry, Farming and Food Innovation Centre	Withdrawn	Adjacent	Data Centre	Unknown	Unknown	Unknown
23/00082/PREAPP Data Centre, Forestry, Farming and Food Innovation Centre	Withdrawn	Adjacent	Data Centre	Unknown	Unknown	Unknown
P22/V2581/SCO Land to the west of Red House Farm, Botley, OX2 9ND	Scoping opinion provided	Adjacent	Request for a Scoping Opinion for a proposed 49.99MW solar scheme	Unknown	Unknown	Unknown
P22/V0144/SCR Land to the west of Red House Farm, Botley, OX2 9ND	Screening decision - positive	Adjacent	Request for an EIA Screening Opinion prior to the submission of an application for the installation of a solar photovoltaic array	Unknown	Unknown	Unknown
P22/V2051/SCR Land to the west of Red House Farm, Botley, OX2 9ND	Screening decision - positive	Adjacent	Updated request for Screening Opinion	Unknown	Unknown	Unknown

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
P18/V2796/SCR Farmoor Reservoir, Farmoor	Screening decision - negative	Adjacent	Request for a Screening Opinion for 7.3MW solar generator on part of reservoir	Unknown	Unknown	Unknown
Tier 3						
EW1 Salt Cross Garden Village Strategic Location for Growth	Approved	Adjacent	2,200 dwellings and 40ha of employment land	Unknown	Unknown	Unknown
EW3 Land east of Woodstock	Approved	Adjacent	300 dwellings	Unknown	Unknown	Unknown
EW5 Land north of Banbury Road, Woodstock	Approved	0.2	180 dwelliings	Unknown	Unknown	Unknown
PR8 Land east of A44	Approved	Adjacent	1950 dwellings and associated infrastructure	Unknown	Unknown	Unknown
PR9 Land west of Yarnton	Approved	Adjacent	540 dwellings and associated infrastructure	Unknown	Unknown	Unknown

Maximum design scenario – cumulative effects assessment

19.9.9 The maximum design scenarios identified in **Table 19.44** have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the Project Design Envelope provided in Volume 1, Chapter 6: Project Description, of the ES as well as the information available on other projects and plans, in order to inform a 'maximum design scenario'. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g., different foundation type or substation layout), to that assessed here, be taken forward in the final design scheme.

Table 19.44 Maximum design scenario for the assessment of cumulative effects

Potential cumulative effect	Phase			Maximum Design Scenario	Justification
	C	O	D		
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	Maximum design scenario as described for the Project (Table 19.34) assessed cumulatively with the following other projects/plans listed in Table 19.43.	The maximum design scenario presents the greatest area required for the construction of the proposed development; the greatest size of the temporary working areas; the movement of construction vehicles; and the longest duration of construction which represents the greatest potential for dust soiling generated by construction and decommissioning activities.
The impact of increases in suspended particulate matter on human receptors arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓		
The impact of increases in pollutants on human receptors arising from traffic emissions generated by construction traffic.	✓	✗	✓		

[a] C=construction, O=operational and maintenance, D=decommissioning

19.10 Cumulative effects assessment

19.10.1 A description of the significance of cumulative effects upon air quality receptors arising from each identified impact is given below.

Construction phase

19.10.2 There is potential for cumulative effects to occur with other proposed / consented (but not constructed) developments within 500 m of the Proposed Development during the construction phase. This distance is two times the relevant study area of the Proposed Development (250 m) and allows for any overlap between the Proposed Development and another cumulative scheme.

19.10.3 However, on the basis that other proposed developments implement suitable primary and tertiary mitigation, as recommended in the Guidance on the assessment of dust from demolition and construction (IAQM, 2024), it is considered that cumulative effects arising during construction are not significant.

19.10.4 Traffic data modelled in section 19.8 includes cumulative developments as outlined in Volume 1 - Chapter 12: Traffic and transport of the ES **[EN010147/APP/6.3]**. On that basis, the cumulative effects from construction traffic are predicted to be not significant.

Operation and maintenance phase

19.10.5 The potential impacts with respect to air quality arising from operations and maintenance of the Proposed Development have been scoped out of the assessment.

Decommissioning phase

19.10.6 The potential impacts during decommissioning of the Proposed Development are expected to be similar to the impacts during demolition, earthworks, construction and trackout. Therefore, it is considered that cumulative effects arising during decommissioning of the Proposed Development are not significant.

19.11 Transboundary effects

19.11.1 As per the Scoping Report **[EN010147/APP/6.5]**, it was concluded that the proposed development is unlikely to have a significant effect either alone or cumulatively on the environment in a European Economic Area State (EEA states) and therefore a transboundary assessment is not proposed in the ES.

19.12 Inter-related effects

19.12.1 Inter-relationships are the impacts and associated effects of different aspects of the Project on the same receptor. These are as follows.

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Proposed Development

(construction, operation and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases.

- Receptor led effects: Assessment of the scope for all relevant effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor.

19.12.2 A description of the likely interactive effects arising from the Project on air quality is provided in Volume 1, Chapter 19: Cumulative Effects and Inter-relationships of the ES.

19.12.3 Table 19.45 lists the inter-related effects (project lifetime effects) that are predicted to arise during the construction, operational and maintenance and decommissioning phases of the Project, and also the inter-related effects (receptor-led effects that are predicted to arise for air quality receptors.

Table 19.45: Summary of likely significant inter-related effects

Description of impact	Phase[a]			Likely significant inter-related effects	Significance
	C	O	D		
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite construction and decommissioning activities.	ü	✗	ü	The potential impacts of dust soiling during the operations and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development, project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on humans will be negligible, which is not significant in EIA terms	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment.
The impact of an increase in suspended particulate matter on people arising from dust emissions generated by onsite construction and decommissioning activities.	ü	✗	ü	The potential impacts of suspended particulate matter on people during the operations and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on humans will be negligible, which is not significant in EIA terms	
The impact of an increase in suspended particulate matter on ecology arising from dust emissions generated by onsite construction	ü	✗	ü	The potential impacts of suspended particulate matter on ecology during the operations and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development, project lifetime	

Description of impact	Phase[a] C	O	D	Likely significant inter-related effects	Significance
and decommissioning activities.				effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on ecology will be negligible, which is not significant in EIA terms	
The impact of emissions from traffic on human-health receptors.	✓	✗	✓	Potential for emissions from vehicles have been assessed in this chapter.	

Receptor-led effects

Dust generated during the construction phase will also affect human receptors that are also likely to experience increased noise and traffic levels. However, embedded mitigation is proposed to ensure suitable management of emissions to air during construction. This is assessed in Volume 1, Chapter 12: Human Health of the ES **[EN010147/APP/6.3]**. Ecological receptors will also be affected by dust and there is the potential for inter-related effects with ecology (Volume 1, Chapter 9: Ecology and Nature Conservation **[EN010147/APP/6.3]**).

Mitigation measures to reduce the dust impact to a level that it not significant will be implemented as documented in the outline Code of Construction Practice (oCoCP) **[EN010147/APP/7.6.1]**. Noise and traffic will also be managed through the oCoCP so the inter-related effects are considered to remain not significant. For the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.

a C=construction, O=operation and maintenance, D=decommissioning

19.13 Summary of impacts, mitigation measures and monitoring

19.13.1 **Table 19.46** presents a summary of the potential impacts, measures adopted as part of the Project and residual effects in respect to air quality. The impacts assessed include:

- The potential impact of dust soiling on dust sensitive receptors arising from demolition, earthworks, construction and trackout;
- The impact of an increase in suspended particulate matter on people arising from dust emissions generated by onsite construction and decommissioning activities
- The impact on ecological receptors arising from dust emissions generated by onsite construction activities.
- The impact on human health receptors arising from emissions generated by construction traffic.

19.13.2 Overall, it is concluded that there will be no significant effects arising from the Proposed Development during the construction, operation and maintenance or decommissioning phases.

19.13.3 Overall, it is concluded that there will be no significant cumulative effects from the Proposed Development alongside other projects/plans.

19.13.4 No potential transboundary impacts have been identified in regard to effects of the Proposed Development.

Table 19.46: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase C O D	Commitment number	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Increase in suspended particulate matter and deposited dust on People and Property	✓ × ✓	Measures listed in Table 19.35	C: Large D: Large	C: High D: High	C: Negligible D: Negligible (Not Significant)	None proposed	C: Negligible D: Negligible (Not Significant)	Monitoring is outlined in Table 19.35.
Increase in suspended particulate matter and deposited dust on ecology.	✓ × ✓	Measures listed in Table 19.35.	C: Medium D: Medium	C: Medium D: Medium	C: Negligible D: Negligible (Not Significant)	None proposed	C: Negligible D: Negligible (Not Significant)	None proposed
The impact of vehicle emissions on human health receptors during construction and decommissioning.	✓ × ✓	N/A	C: Large D: Large	C: High D: High	C: Negligible D: Negligible (Not Significant)	None proposed	C: Negligible D: Negligible (Not Significant)	None proposed

[a] C=construction, O=operational and maintenance, D=decommissioning

Table 19.47: Summary of potential cumulative environmental effects, mitigation and monitoring.

Description of effect	Phase C O D	Commitment number	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Tier 1								
Increase in suspended particulate matter and deposited dust on People and Property	✓ × ✓	Measures listed in Table 19.35.	C: High D: High	C: Large D: Large	C: Negligible D: Negligible (Not Significant)	None proposed	C: Negligible D: Negligible (Not Significant)	Monitoring is outlined in Table 19.35.
Increase in suspended particulate matter and deposited dust on ecology	✓ × ✓	Measures listed in Table 19.35.	C: Medium D: Medium	C: Medium D: Medium	C: Negligible D: Negligible (Not Significant)	None proposed	C: Negligible D: Negligible (Not Significant)	None proposed
The impact of vehicle emissions on human health receptors during construction and decommissioning.	✓ × ✓	N/A	C: Large D: Large	C: High D: High	C: Negligible D: Negligible (Not Significant)	None proposed	C: Negligible D: Negligible (Not Significant)	None proposed

[a] C=construction, O=operational and maintenance, D=decommissioning

19.14 References

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