Ansty Garden Community

Environmental Statement

Volume 2

November 2023

CHAPTER 8: AIR QUALITY

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8 Air Quality

8.1 Scope of Assessment

8.1.1 This chapter of the ES assesses the likely significant effects of the Proposed Development and Parkland Reserve Site in terms of air quality and odour and is supported by **ES Volume 2, Appendix D: Air Quality**, which includes the following:

- Appendix D1: Air Quality Monitoring Method;
- Appendix D2: Construction Dust Assessment Method;
- Appendix D3: Air Quality Detailed Dispersion Modelling Assessment Method;
- Appendix D4: Assessment of Effects on Ecological Receptors; and,
- Appendix D5: Odour Assessment. The odour assessment findings and conclusions are summarised throughout this chapter.

8.1.2 The chapter describes: the assessment methodology; the baseline conditions currently existing at the Site and in the surrounding area; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; the likely residual effects after these measures have been employed; and the cumulative effects associated with the Proposed Development in combination with other committed developments within 5 km of the Site.

8.1.3 Whilst air quality has improved in England over recent decades, it continues to be the biggest environmental risk to public health, with children, the elderly and the already vulnerable affected most. *"Poor air quality also has consequences for crop yields and, particularly in the case of ammonia (NH_3) and oxides of nitrogen (NOx), significant impacts for the natural environment and biodiversity"* [1].

8.1.4 The primary air pollutants of interest for this assessment are oxides of nitrogen (NOx), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), fine particulate matter with a diameter of less than 10 micrometres and 2.5 micrometres (PM_{10} and $PM_{2.5}$) and ammonia (NH_3), as well as dust generated from construction related activities. Likely significant effects are identified in relation to air quality threshold. The impact of odour against odour assessment thresholds has also been considered.

8.1.5 'Type 1' cumulative ('intra-project') effects, which are combined effects of individual EIA topic effects on a particular receptor, are considered in **ES Volume 2, Chapter 14: Effect Interactions**.

[1] Department for Environment, Food and Rural Affairs (Defra), 2023. *Air quality strategy: framework for local authority delivery.*

8.2 Key Legislation, Policy and Guidance Considerations

8.2.1 The air quality assessment has been undertaken within the context of relevant planning policies, guidance documents and legislative instruments. These are summarised below.

8.2.2 The legislation, policy and guidance applicable to odour is summarised below and in **ES Volume 2, Appendix D5.**

Legislation and Regulation

Air Quality

Air Quality Management

8.2.3 The ambient air quality objectives (AQOs) are established in the Air Quality (England) Regulations 2000, as amended.[2] The Environment Act 1995, as amended[3], requires all local authorities to carry out periodic reviews of air quality within their administrative areas. Where air quality is known or expected to exceed one or more of the AQOs, they must declare an air quality management area (AQMA) and implement an air quality action plan (AQAP) to work toward meeting the AQOs.

8.2.4 The Environment Act 2021 amends part of the Environment Act 1995 and sets legally binding targets in priority areas including air quality, which must be met in England over a 25-year period. The Act requires Environmental Improvement Plans to be produced by the Department for Environment, Food and Rural Affairs (Defra) to monitor progress and commits the Government to increasing effort to meet those targets if insufficient progress is made.

8.2.5 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 set the following legally binding targets (LBTs) to be met by 2040:

- Annual mean concentration target (AMCT) regarding particles with a diameter of less than 2.5 micrometres ($PM_{2.5}$) of 10µg/m^3; and,
- Population exposure reduction target (PERT) of 35% compared to 2018 exposure.

8.2.6 The Environmental Improvement Plan 2023[4] set interim targets (ITs) for $PM_{2.5}$ to be met by end of January 2028:

- AMCT of 12µg/m^3; and,

[2] Air Quality (England) Regulations 2000.

[3] Environment Act 2021.

[4] Department for Environment, Food and Rural Affairs, 2023. Environmental Improvement Plan 2023: First revision of the 25 Year Environment Plan.

- PERT of 22% (compared to 2018 exposure).

8.2.7 Moreover, the European Union emissions limit values derived from the Ambient Air Quality Directive (2008/50/EC)[5] were transposed into English and Welsh law as air quality standards (AQSs) via the Air Quality Standards Regulations 2010, as amended[6]. This Regulation sets pollutant concentrations limit values for human health and critical levels for the protection of ecosystems in relation to plant physiology, growth and vitality.

Air Quality Assessment Thresholds

8.2.8 Across the country, most of the AQOs and AQSs are no longer breached. Therefore, this air quality assessment has focussed on achieving compliance with those established for those AQOs and AQSs which continue to be breached in local hotspots and which are considered relevant based on the nature of the Proposed Development.

8.2.9 Planning applications are not yet required to meet the LBTs or ITs (although updates to national planning guidance are being considered); however, local authorities are expected to work towards these targets through the planning system[7].

8.2.10 This assessment has also considered the extent to which critical loads relating to the protection of ecosystems are breached. These levels have been adopted by the European Union and the United Nations Economic Commissions for Europe (UNECE) and are commonly used as regulatory standards.

8.2.11 The thresholds shown in **Table 8.1** below have been considered within this assessment. The AQSs and AQOs are herein referred to as AQOs.

Table 8.1: Air quality thresholds relevant to the assessment

Pollutant	Threshold level	Type of threshold	Measured as	Receptors to which threshold level applies
NH_3	1 µg/m^3 (for lichens and bryophytes) 3 µg/m^3 elsewhere	Critical level	Annual mean	Ecological receptors
NOx	30µg/m^3	AQS	Annual mean	Ecological receptors

[5] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. European Commission.

[6] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

[7] Department for Environment, Food and Rural Affairs, 2023. Air quality strategy: framework for local authority delivery.

Pollutant	Threshold level	Type of threshold	Measured as	Receptors to which threshold level applies
Nitrogen dioxide (NO_2)	200µg/m^3, not to be exceeded more than 18 times per year	AQO	One-hour mean	Anywhere where a member of the public may spend one hour or longer
NO_2	40µg/m^3	AQO	Annual mean	Human residences, schools and hospitals
Particles with a diameter of less than 10 micrometres (PM_{10})	50µg/m^3, not to be exceeded more than 35 times per year	AQO	24-hour mean	Human residences, schools and hospitals and private gardens
PM_{10}	40µg/m^3	AQO	Annual mean	Human residences, schools and hospitals
$PM_{2.5}$	20µg/m^3	AQS	Annual mean	Human residences, schools and hospitals
$PM_{2.5}$	10µg/m^3	LBT	Annual mean	Human residences, schools and hospitals
Deposited nutrient nitrogen	10 Kg N/ha/year	Lower critical load	Annual mean	Ancient Woodland
Acid deposited within the ecosystems being considered	Depends on location	Critical load function	Annual mean	Ancient Woodland

Odour

Environmental Protection Act 1990

8.2.12 Odour emissions and associated impacts are not covered by statutory standards in the UK. This is due to the subjective nature of odours and the issues surrounding measurement and assessment.

8.2.13 There are many activities which result in odour release and many of these odours have the potential to result in a loss of amenity for affected receptors (e.g. nearby residents, schools or places of work) or in some cases a statutory nuisance. It is up to the local authority or the Environment Agency to decide whether odorous emissions constitute a statutory nuisance. As defined in the Environmental Protection Act 1990, statutory nuisance is considered as:

"(c) fumes or gases emitted from premises so as to be prejudicial to health or a nuisance;

"(d) any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance;".

8.2.14 The Environmental Protection Act 1990[8] specifies that:

"[…] it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisances which ought to be dealt with under section 80 [which specifies that a local authority shall serve an abatement notice on statutory nuisance to impose various requirements] below and, where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint".

Planning Policy

National Planning Policy Framework and Planning Practice Guidance

8.2.15 The National Planning Policy Framework (NPPF)[9] was last updated during September 2023. The NPPF establishes a framework under the Town and Country Planning Act which should be used by local authorities to make local plans and determine planning applications.

8.2.16 Paragraph 130 states that *"Planning policies and decisions should ensure that developments… create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience"*.

8.2.17 Paragraph 170 states that the planning system should contribute to and enhance the natural and local environment by *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"*.

8.2.18 Paragraph 174 states: *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*

"e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions….".

8.2.19 Paragraph 185 states that: *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment,*

[8] Environment Protection Act 1990.

[9] Department for Levelling Up, Housing and Communities, 2023. *National Planning Policy Framework.*

as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development….".

8.2.20 Paragraph 186 states: *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan".*

8.2.21 Moreover, paragraph 187 states: "*Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed".*

8.2.22 In relation to air pollutants, its focus is on achieving compliance with the AQOs and limit values, hence their adoption as the assessment criteria.

8.2.23 The 2019 Air Quality Planning Practice Guidance[10] supports the NPPF, by including recommendations on the scope of an air quality assessment. Its stated purpose is to provide "*guiding principles on how planning can take into account the impact of new development on air quality*". The guidance specifies that *"odour and dust can also be a planning concern, for example, because of the effect on local amenity*".

Regional and Local Policy and Guidance

Mid Sussex District Local Plan 2014 - 2031

8.2.24 Policy DP29 ("Noise, Air and Light Pollution") of the Mid Sussex District Council (MSDC) Local Plan[11], adopted during 2018, states that:

"The environment, including nationally designated environmental sites, nationally protected landscapes, areas of nature conservation or geological interest, wildlife habitats,

[10] Ministry of Housing, Communities and Local Government, 2019. *Planning Practice Guidance: Air Quality.*

[11] MSDC, 2018. *Mid Sussex District Local Plan 2014 - 2031.*

and the quality of people's life will be protected from unacceptable levels of noise, light and air pollution by only permitting development where….

Air Pollution:

- *It does not cause unacceptable levels of air pollution;*
- *Development on land adjacent to an existing use which generates air pollution or odour would not cause any adverse effects on the proposed development or can be mitigated to reduce exposure to poor air quality to recognised and acceptable levels;*
- *Development proposals (where appropriate) are consistent with Air Quality Management Plans".*

Mid Sussex District Plan (Draft) 2021 – 2039

8.2.25 As of September 2023, MSDC are understood to be reviewing consultation responses in relation to the land allocated for development within their draft District Plan[12], which will eventually replace their current (2014-2031) Local Plan.

8.2.26 Policy DPN6: Pollution in the District Plan states that:

"*Development should not result in pollution or hazards, including air, noise, vibration, light, water, soil, odour, dust or other pollutants, which significantly adversely impact on people, including health and quality of life, and the natural environment, including nature conservation sites*".

8.2.27 Policy DPN9: Air Quality in the District Plan states that:

"The natural environment and people's health and quality of life will be protected from unacceptable levels of poor air quality.

The use of active and sustainable travel measures and green infrastructure to reduce pollution concentrations and exposure is encouraged.

Development proposals will need to take into account the Council's air quality guidance.

The Council will require applicants to demonstrate that there is not an unacceptable impact on air quality. The development should minimise any air quality impacts, including cumulative impacts from committed developments, both during the construction process and lifetime of the completed development, either through a redesign of the development proposal or, where this is not possible or sufficient, through appropriate mitigation.

Where sensitive development is proposed in areas of existing poor air quality and/ or where major development is proposed, including the development types set out in the Council's current guidance (Air Quality and Emissions Mitigation Guidance for Sussex (2021 or as updated)) an air quality assessment will be required.

[12] MSDC, 2021. Mid Sussex District Plan 2021-2039.

Development proposals that are likely to have an impact on local air quality, including those in or within relevant proximity to existing or candidate Air Quality Management Areas (AQMAs) or designated nature conservation areas sensitive to changes in air quality, will need to demonstrate measures/ mitigation that are incorporated into the design to minimise any impacts associated with air quality.

Mitigation measures will need to demonstrate how the proposal would make a positive contribution towards the aims of the Council's Air Quality Action Plan where it is relevant and be consistent with the Council's current guidance as stated above.

Mitigation measures will be secured either through a negotiation on a scheme, or via the use of planning condition and/ or planning obligation depending on the scale and nature of the development and its associated impacts on air quality.

In order to prevent adverse effects on the integrity of the Ashdown Forest SPA and SAC, new development likely to result in increased traffic may be expected to demonstrate how any air quality impacts, including in combination impacts, have been considered in relation to the Ashdown Forest SAC. Any development likely to have a significant effect, either alone or in combination with other development, will be required to demonstrate that adequate measures are put in place to avoid or mitigate for any potential adverse effects."

Technical Standards and Guidance

Air Quality

Guidance on the Assessment of Dust from Demolition and Construction

8.2.28 The Guidance on the Assessment of Dust from Demolition and Construction (the 'IAQM 2023 guidance')[13], which was published in 2023, provides a framework for assessing the risk which fugitive dust and PM could have on air quality and suggests appropriate dust and air emissions mitigation measures for sites according to the level of risk.

Land-Use Planning & Development Control: Planning for Air Quality

8.2.29 Published by Environmental Protection UK (EPUK) and the IAQM, the Land-Use Planning & Development Control: Planning for Air Quality (the 'EPUK-IAQM guidance')[14] includes a method for screening the requirement for an air quality assessment and determining the significance of any air quality impacts associated with a development proposal. It also identifies mitigation measures which can be implemented to reduce air quality effects attributable to a scheme.

[13] Institute of Air Quality Management, 2023. *Guidance of the Assessment of dust from demolition and construction (Version 2.1).*

[14] Environmental Protection UK & the Institute of Air Quality Management, 2017. Land-Use Planning & Development Control: Planning for Air Quality.

A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites

8.2.30 This guidance, published by the Institute of Air Quality Management in 2020[15] ('the IAQM 2020 guidance'), identifies a process which can be used to scope the assessment (informing the study area, relevant receptors and pollutants of concern), the locations from which baseline information can be obtained, advises on how air quality should be assessed and air quality impacts on nitrogen deposition rates identified. It also provides a screening criterion indicating when the potential for significant effects cannot be ruled out. Where an effect cannot be ruled out, the guidance advises the assessment results are reviewed by an ecologist for further determination.

Local Air Quality Management Technical Guidance ('TG22')

8.2.31 The Local Air Quality Management Technical Guidance ('TG22')[16] include guidance for local authorities to assess and, where required, deliver improvements in air quality within their jurisdiction. TG22 also recommends where the AQOs should be applied, as outlined in **Table 8.2**, and provides guidance on some steps which it advises local authorities take towards modelling (such as model verification) and monitoring air quality using diffusion tubes.

Table 8.2: Examples of where the air quality objectives should apply, as per TG22

Averaging Period Objectives	Objectives should apply at	Objectives should generally not apply at
Annual mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades 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. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean and 8-hour mean	All locations where the annual mean objective would apply, together with hotels.	Kerbside sites (as opposed to locations at the building facade), or any other location where public

[15] Institute of Air Quality Management, 2020. *A guide to the assessment of air quality impacts on designated nature conservation sites.*

[16] Department for Environment, Food and Rural Affairs, 2022. Part IV of the Environment Act 1995: Local Air Quality Management: Technical Guidance (TG22), London: Crown.

Averaging Period Objectives	Objectives should apply at	Objectives should generally not apply at
	Gardens of residential properties (not at peripheries or front gardens unless exposure is likely there).	exposure is expected to be short term.
1-hour mean	All locations where the annual mean and: 24 and 8-hour mean objectives apply. Kerbside sites (for example, 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 where members of the public might reasonably expect to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-minute mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

Air Quality and Emissions Mitigation Guidance for Sussex (2021)

8.2.32 The Air Quality and Emissions Mitigation Guidance for Sussex ('the AQEM 2021 guidance')[17] describes the method which should be adopted to screen the requirement for an air quality and emissions mitigation (including damage cost) assessment. It also outlines the suite of mitigation measures which should be implemented for a given scheme.

[17] Sussex-air partnership, 2021. *Air quality and emissions mitigation guidance for Sussex (2021).*

Odour

Environment Agency Guidance

8.2.33 The Environment Agency (EA) has issued guidance[18] on odour which contains indicative benchmark levels for use in the assessment of potential impacts from facilities regulated under the Environmental Permitting (England and Wales) Regulations (2010)[19] and subsequent amendments (2016)[20].

8.2.34 Benchmark levels are stated as the 98th percentile (%ile) of hourly mean concentrations in European odour units (ou_E) over a year for odours of different offensiveness. In practice, this is the 175th highest hourly average recorded in the year. EA odour benchmark levels are summarised in **Table 8.3** below.

Table 8.3: Examples of where the air quality objectives should apply, as per TG22

Benchmark Level as 98th %ile of 1-hour Means (ou_E/m^3)	Offensiveness	Odour emission sources
1.5	Most offensive	Processes involving decaying animal or fish. Processes involving septic effluent or sludge. Biological landfill odours.
3.0	Moderately offensive	Intensive livestock rearing. Fat frying (food processing). Sugar beet processing. Well aerated green waste composting.
6.0	Less offensive	Brewery. Confectionery. Coffee roasting. Bakery.

8.2.35 The guidance also describes the 'hedonic tone' of an odour, i.e. the generally accepted degree of pleasantness or unpleasantness (offensiveness) for a particular odour. Hedonic tones typically range from +4 for very pleasant odours (e.g. bakeries) to -4 for foul odours (e.g. rotting flesh). Neutral odours score 0. The hedonic tone score refers to the type of smell, irrespective of its intensity. This helps to decide how offensive an odour may be.

[18] Additional Guidance for H4 Odour Management, 2011. Environment Agency.

[19] The Environmental Permitting (England and Wales) Regulations 2010.

[20] The Environmental Permitting (England and Wales) Regulations 2016.

Guidance on the Assessment of Odour for Planning (Institute of Air Quality Management, 2018) ('the IAQM 2018 guidance')

8.2.36 This guidance, issued by the Institute of Air Quality Management (IAQM) in July 2018[21], advises that the perception of an odour is generally dependent on the relationship between odour sources, the number and sensitivity of any receptors, and the pathway connecting them. The effects of odour at individual receptors are dependent on the 'FIDOL' factors described below:

- *"(F) Frequency of exposure;*
- *(I) Intensity: The individual's perception of the strength of the odour;*
- *(D) Duration: The overall duration that individuals are exposed to an odour over time;*
- *(O) Offensiveness: Odour unpleasantness or offensiveness describes the character of an odour as it relates to the 'hedonic tone' (which may be pleasant, neutral or unpleasant) at a given odour concentration/intensity. This can be assessed in the laboratory and when measured by the standard method and expressed on a standard nine-point scale, it is termed the hedonic score; and,*
- *(L) Location/ (R) Receptor Sensitivity: The type of land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor. The Location factor can be considered to encompass the receptor characteristics, receptor sensitivity, and socio-economic factors".*

8.2.37 The guidance suggests a method for field subjective olfactometric 'sniff test' assessments, dispersion modelling assessments and suggests approaches to assess the significance of odour effects, based on these FIDOL factors.

8.2.38 It suggests that receptor sensitivity can be defined by the definitions described in **Table 8.4**, regardless of the type of assessment completed.

Table 8.4: Definitions of receptor sensitivity used in this assessment (derived from the IAQM 2018 guidance)

Receptor Sensitivity Category	Description of Receptor Sensitivity
High sensitivity receptor	Surrounding land where: • Users can reasonably expect enjoyment of a high level of amenity; and • People would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples may include residential dwellings, hospitals, schools / education and tourist / cultural.

[21] Institute of Air Quality Management, 2018, Guidance on the assessment of odour for planning 2018 v.1.1.

Receptor Sensitivity Category	Description of Receptor Sensitivity
Medium sensitivity receptor	Surrounding land where: • Users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or • People 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. Examples may include places of work, commercial/retail premises and playing/recreation fields.
Low sensitivity receptor	Surrounding land where: • The enjoyment of amenity would not reasonably be expected; or • There is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples may include industrial use, farms, footpaths and roads.

8.3 Assessment Methodology

8.3.1 The Proposed Development and Parkland Reserve Site have been considered holistically within this assessment and ES chapter; however, the Parkland Reserve Site is not anticipated to provide any additional notable vehicle movements during the construction and operation of the Parkland Reserve Site. Consequently, the effects of the Proposed Development (during both construction and operation) are considered to be representative of the Proposed Development and the Parkland Reserve Site.

8.3.2 The approach taken for assessing the potential air quality and odour impacts of the Proposed Development is as follows:

- Baseline characterisation of local air quality;
- Qualitative assessment of fugitive dust and emissions from construction related activities;
- Advanced dispersion modelling assessment of air quality impacts attributable to increases in vehicle movements because of the Proposed Development when operational;
- Assessment of odour impacts from the nearby Cuckfield Wastewater Treatment Works (WWTW) on proposed receptors;
- Recommendation of mitigation measures, where appropriate, to ensure any adverse effects on air quality and odour are minimised; and

- Identification of residual effects resulting from the Proposed Development.

8.3.3 Further information is provided in the forthcoming subsections.

Determination of Baseline

8.3.4 Different methods have been used to characterise baseline air quality regarding emissions of air pollutants from vehicle movements; fugitive dust generated from construction related activities; and any effects from odour generated by the WWTW on future Proposed Development users.

8.3.5 Baseline odour concentrations at the Site were determined using 'sniff tests'. Further details regarding the method and outcomes of the sniff tests are summarised in **ES Volume 2, Appendix D5**.

8.3.6 Existing or baseline air quality refers to the concentrations of relevant pollutants that are already present in ambient air, including road traffic and industrial sources. Additional road traffic attributable to the Proposed Development will contribute to the future baseline.

8.3.7 A study has been undertaken using data obtained from diffusion tube monitoring undertaken around the Site by MSDC and for the project; and estimated background from the United Kingdom Air Information Resource (UK-AIR) website maintained by Defra. Temple completed the air quality monitoring from 26th August to 5th December 2022.

8.3.8 In **Section 8.5**, this data has been described and the potential for future Proposed Development users to be introduced into an area of poor ambient air quality assessed.

8.3.9 There is no existing network of monitoring undertaken to monitor dust levels across the United Kingdom, nor is the assessment of dust generated by construction related activities dependent on baseline pollutant concentrations; therefore, this has not been assessed.

Prediction Methodology

Construction Phase Dust Assessment

8.3.10 Potential air emissions from construction activities, particularly in the form of dust, have the potential to cause a loss of amenity (due to dust soiling) or to affect (vascular) plant species sensitive to dust. The finer fraction of dust, in the form of PM_{10} and PM of finer fractions, also has the potential to affect human health. Given the variability of construction sites and the range of activities undertaken, a quantitative assessment of the dust and air pollutants generated is rarely feasible or practicable. Instead, a qualitative assessment has been undertaken to identify best practicable means for mitigating potential emissions.

8.3.11 The IAQM 2023 guidance has been used to undertake the risk assessment and identify appropriate mitigation measures. The method involves assessment of the:

- **Dust Emissions Magnitude:** the dust emissions magnitude will be assessed as 'negligible', 'low', 'medium' or 'high' for each type of construction-related activity (demolition, earthworks, construction and trackout);
- **Receptor Sensitivity:** the 'area' sensitivity will be assessed as 'negligible', 'low', 'medium' or 'high' for each type of construction-related activity and each type of impact (amenity, human health and ecological) based on individual receptor sensitivity and proximity; and
- **Assessment of dust risk:** The dust risk (or impact) at each individual receptor is assessed as 'negligible', 'low', 'medium' or 'high' based on the impact magnitude and receptor sensitivity.

8.3.12 The method recommended by this guidance is outlined in **ES Volume 4, Appendix D1**.

Significance Criteria

8.3.13 The risk of dust impacts from construction activities were defined by assessing the impact magnitude and receptor sensitivity and determining the dust impact risk based on the combined values presented..

8.3.14 The significance of the potential for dust to affect sensitive receptors before mitigation has been assessed using professional judgement but based on the highest risk of dust impacts assessed in any one category. For example, where there is a medium or high risk of dust impacts in the absence of mitigation, this would be viewed as having a moderately or highly significant impact.

8.3.15 The significance of effects following the implementation of mitigation has then been reassessed. In this regard, the IAQM 2023 guidance indicates that *"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'."*

8.3.16 The significance of effects connected with construction related vehicle movements is outlined below.

Assessment of Vehicle Emissions (Construction and Operational Phases)

8.3.17 The combustion of fuel in vehicles leads to several harmful by-products which can affect air quality in the vicinity of roads. Areas with high traffic volumes or near to major roads often experience elevated pollutant levels.

8.3.18 A screening assessment has been undertaken, following the methodology detailed in EPUK-IAQM and the AQEM 2021 guidance, to determine whether significant air quality effects associated with the introduction of vehicles attributable to the Proposed Development could be screened out.

8.3.19 As the Proposed Development is 'major', as defined by the Town and Country Planning (Development Management Procedure) Order (England) 2015, an air quality and emissions mitigation assessment should be undertaken according to the AQEM 2021 guidance. The emissions mitigation assessment has not been undertaken, as outlined in **Section 8.3.46**.

8.3.20 The AQEM 2021 guidance indicates that an air quality assessment should be completed in accordance with the EPUK-IAQM guidance. The screening criteria from the EPUK-IAQM guidance have therefore been used to determine the scope of the air quality assessment. The indicative screening criteria for a detailed dispersion modelling assessment of air quality traffic impacts is as follows:

- A change of Light Duty Vehicle (LDV) flows of:
  - More than 100 annual average daily traffic (AADT) within or adjacent to an AQMA;
  - More than 500 AADT elsewhere.
- A change of Heavy Duty Vehicles (HDV) flows of:
  - More than 25 AADT within or adjacent to an AQMA;
  - More than 100 AADT elsewhere.

8.3.21 While undergoing construction, the Proposed Development is anticipated to lead to a peak increase of 75 (two way) vehicle movements expressed as an annual average daily traffic (AADT) flow, which will vary based on the current phase of construction. Of these peak 75 vehicle movements, 25 (33.3%) of the movements (two way) will be heavy duty vehicles (HDVs), expressed as an AADT. As such, the Proposed Development's construction phase traffic anticipated to be generated does not breach the EPUK-IAQM guidance screening criteria and, therefore, a detailed dispersion modelling assessment of construction phase traffic impacts has not been undertaken.

8.3.22 Once operational, the Proposed Development is expected to lead to an increase in vehicle movements in breach of the screening criteria. The Site is predicted to see an increase of 4,256 AADT movements (two way), of which the project's Transport Consultant has assumed 2.1% (89) are HDV movements. As such, a detailed dispersion modelling assessment of operational impacts has been undertaken.

8.3.23 The study area relating to vehicle emissions included the roads within the traffic model at and around the Site, including within the vicinity of the existing and proposed receptors in the locations where the greatest increase in traffic may be expected.

8.3.24 Vehicle emissions from the construction and operational activities are represented across the following scenarios:

- **Scenario 1 (S1):** base year, using 2019 traffic data and 2019 background pollutant concentrations and emissions factors (2019 baseline traffic flows have been used as 2019 reflects the baseline year of the Mid Sussex Strategic Highway Model, which has been used, as agreed with West Sussex County Council);
- **Scenario 2 (S2):** traffic flows anticipated during 2039, without the Proposed Development in place but inclusive of committed / consented development traffic and committed infrastructure improvements; and
- **Scenario 3 (S3):** traffic flows anticipated during 2039, with the Proposed Development in place and inclusive of committed / consented development traffic and committed infrastructure improvements.

8.3.25 The Proposed Development is expected to fully open during 2032. Vehicle emissions factors and pollutant background concentrations, defined within **ES Volume 4, Appendix D3,** are for 2030. It is expected that traffic volumes during 2039 would be greater than those assessed during 2032. In addition, vehicle emissions per unit distance travelled are projected to fall as newer vehicles are progressively entering the road network, replacing older vehicles. This underpins part of the projected reduction in pollutant concentrations in background (see **Section 8.5.9**) with time. Therefore, the use of 2039 traffic data with 2030 emissions factors and background pollutant concentrations, is considered conservative.

8.3.26 It is acknowledged that that construction phase traffic may generate cumulative effects with traffic generated whilst the Proposed Development is partially operational. However, the first phase of the Proposed Development is expected to open during 2027. The volume of traffic generated during 2027 would be less than the volume of traffic generated during 2030. The impact generated by traffic during the year 2027 has the potential to exceed that in 2030, as the emissions generated per vehicle would be greater, despite that the Site-generated traffic volumes would be much less. Even if this were the case, these impacts would be transient and are not assessed further in this ES Chapter.

8.3.27 The IAQM 2020 guidance contains scoping criteria which have been used to determine the need for an ecological assessment, as follows:

- Distance screen: Designated ecological sites more than 200 m from any roads, routes or other significant sources of air pollutants for which traffic data etc. are available will be excluded; and
- Effects of the project: Designated ecological sites will only be considered where the project leads to an increase in the AADT flow of >1,000 vehicles on roads passing within 200 m of the Site and Parkland Reserve Site.

8.3.28 Despite the 'effects of the project' criterion, some Ancient Woodland sites located near the Site (where the Proposed Development led to a smaller than 1,000 AADT increase in traffic on the nearest road) were also considered, such as where adjacent to the local road network or located near roads where traffic volumes increased as a

result of the Proposed Development, despite not meeting the above screening criterion.

8.3.29 The ADMS-Roads detailed dispersion model (version 5) was used to assess direct effects from the additional traffic on local air quality during 2019 and 2039. The model considers the key variables that influence pollutant emission and dispersion (meteorology, surface roughness, diurnal traffic flows, predicted future traffic mixes and predicted future engine emission standard mixes). Annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ were predicted at a number of locations in the vicinity of the Site. The receptors chosen include those that are representative of worst-case exposure locations within the modelled study area.

8.3.30 The dispersion modelling assessment method, as well as the method used to process the results in relation to the impacts on human receptors, is further described in **ES Volume 4, Appendix D3**. The method used to assess and interpret the results on ecological receptors is described in **ES Volume 4, Appendix D4**.

Significance Criteria

8.3.31 The significance of effects associated with permanent sources of air pollution once operational has been determined to account for impacts generated in connection with each of the following:

- The impacts of the Proposed Development (once operational) on air quality at existing human and ecological receptors using the assessment criteria in the EPUK-IAQM or IAQM 2020 guidance; and
- The number of future Site users (of the Proposed Development) exposed to poor ambient air quality.

Significance Criteria – Impacts on Existing Human Receptors

8.3.32 The potential impacts of the Proposed Development were assessed by comparing estimated pollutant concentrations with the AQOs (**Table 8.1**), with and without the Proposed Development in place. The EPUK-IAQM guidance descriptors for magnitude of impact were used to assess the annual mean changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations, primarily because the mechanism considers the effects in terms of the magnitude of change from predicted concentrations and also relative to the AQOs.

8.3.33 **Table 8.5** shows the EPUK-IAQM guidance impact descriptors that take account of the percentage change in concentration relative to the air quality assessment level (AQAL), such as the annual mean objectives, and the annual mean concentration at the receptor during the assessment year.

Table 8.5: Air quality impact descriptors for changes to annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations

Annual mean concentration at receptor in assessment year	% Change in concentration relative to 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 of AQAL	Moderate	Substantial	Substantial	Substantial

8.3.34 Changes in the hourly mean NO_2 and daily mean PM_{10} concentrations should not be assessed using the EPUK-IAQM guidance criteria specified above. Consequently, the following impacts would be considered to exert significant effects at a specific receptor location:

- Where the Proposed Development causes a receptor to exceed an annual mean NO_2 concentration of 60µg/m^3, where it did not without the Proposed Development in place; and / or
- Where the Proposed Development causes a receptor to exceed the daily mean PM_{10} AQO more than the 35 times per year permissible.

8.3.35 The EPUK-IAQM guidance impact magnitude descriptors were considered, alongside receptor sensitivity, to determine air quality effect descriptors for specific receptors considered in this assessment.

8.3.36 As shown in **Table 8.2**, the locations where the ambient AQOs should be applied has been outlined in TG22, based on the potential sensitivity of receptors to acute and chronic exposure to air pollutants. The assessment has reported pollutant impact magnitudes at receptor locations where the ambient AQOs are recommended to be applied in TG22. Consequently, all reported receptors should be considered as being of a 'high' sensitivity. These receptors, where the annual mean AQOs apply at, are considered to have a 'high' sensitivity due to being exposed to pollutants for a longer duration or being representative of particularly vulnerable populations. This includes building facades of residential properties, schools, hospitals, care homes etc.

8.3.37 Since all the receptors considered have the same sensitivity, there is a relationship between impact descriptors and effect descriptors as shown in **Table 8.6**. Moderate or major effects are considered potentially significant, and minor and negligible effects are considered not significant.

Table 8.6: Air Quality Effect Descriptors for Receptors Considered

Impact Descriptor	Effects Descriptor
Negligible	Negligible
Slight	Minor
Moderate	Moderate

Impact Descriptor	Effects Descriptor
Substantial	Major

8.3.38 The overall significance of predicted changes in local air quality on human receptors, including background pollutant concentrations, has been established through the consideration of the following factors:

- The existing and future air quality in the absence of the Proposed Development;
- Duration (temporary or long term);
- Reversibility (reversible or permanent);
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Significance Criteria – Impacts on Proposed Human Receptors

8.3.39 To determine the potential for future users of the Proposed Development to be introduced into an area of poor ambient air quality, concentrations at the on-site receptors were compared to the appliable AQOs (summarised in **Table 8.1**).

8.3.40 Before mitigation, an effect has been identified as significant where the annual mean AQO is exceeded or close to being exceeded at one or more of the on-site receptor locations representative of relevant exposure.

Impact of Odour on Future Site Users

8.3.41 The ADMS-Roads model has been used to model odours connected with the current operation of the Cuckfield Wastewater Treatment Works on amenity (potential for odour related nuisance), undertaken in accordance with the following outline scope:

- Description of relevant national and local legislation and policy;
- Detailed (quantitative) dispersion modelling assessing the potential odour effects of the WWTW on future Site users;
- Olfactometric sniff testing to corroborate the dispersion modelling assessment;
- Discussion of results; and
- Conclusion and recommendations.

8.3.42 The method used to assess the impact of odour on future Site users from the WWTW is derailed further in **ES Volume 2, Appendix D5**, as are the significance criteria and limitations and assumptions within the report.

Limitations and Assumptions

8.3.43 The below listed additional limitations and assumptions have been identified regarding the air quality dispersion modelling assessment method.

8.3.44 There will be uncertainties introduced as the model uses a series of algorithms to simplify real world dispersion processes. It has also been assumed that dispersion will conform to a Gaussian distribution over flat terrain, thereby simplifying dispersion conditions.

8.3.45 Much of the data imported into the model is based on reasonable estimates. For example, it is assumed that the AADT flow would represent conditions over a year, emissions generated from the Emission Factor Toolkit (EFT) represent the average of vehicles from the fleet and modelled background pollutant concentrations are representative of conditions at the Site. It is also assumed that the meteorological data, surface roughness and Monin-Obukhov length would represent dispersion conditions across the modelled domain.

8.3.46 It is recognised that the AQEG 2021 guidance would typically expect an emissions mitigation assessment to be prepared. Due to the outline nature of the application, it has not been possible to undertake damage costs and to quantify the cost of mitigation measures. This is because the extent of measures to be agreed within the travel plan; and the type of buses which are proposed to serve the Proposed Development (public, on-demand or a mixture) is not yet known; nor are the times at which mitigation would be implemented. Should these be required, it is recommended mitigation measures could be agreed at a later stage in the planning process.

8.3.47 The traffic flows used in this assessment (provided by the project's Transport Consultant) were based on the Mid Sussex Strategic Highway Model and a future year of 2039 (which is the end of the period for the draft Mid Sussex District Plan), as agreed with West Sussex County Council, to ensure that a worst-case scenario in terms of traffic growth has been considered and assessed.

8.4 Scoping and Consultation

8.4.1 Temple contacted MSDC to request permission to install air quality monitoring equipment ('diffusion tubes' as outlined below) during September 2022. A response was not received before monitoring commenced.

8.4.2 A formal scoping process with MSDC was not undertaken and no statutory undertakers were directly consulted to advise on the scope of the ES Chapter. However, the ES Chapter has been prepared based on significant previous experience and local knowledge and understanding.

8.5 Baseline Assessment and Identification of Key Receptors

Characterisation of Air Quality Impacts on Human Health

Site Environs and Presence of AQMAs

8.5.1 The Site is adjacent to the nearby main road, A272 / Cuckfield Bypass located to the north and west of the Site, a 'through' road carrying a large volume of baseline road traffic with the potential to affect air quality at the Site.

8.5.2 MSDC has one designated Air Quality Management Area (AQMA)[22], 'Mid Sussex District Council AQMA No.1', declared for exceedances of the annual NO_2 AQO. The AQMA is located approximately 7.8 km to the south of the Site; therefore, the Site is not located in or near an AQMA.

Local Authority Air Quality Monitoring

8.5.3 According to the Air Quality Annual Status Report issued by MSDC[23], no air quality monitoring has been undertaken by MSDC within 2 km of the Site. The closest local authority monitoring location to the Site is South Road, Haywards Heath (MSAQ1), which is a roadside NO_2 passive diffusion tube monitor located approximately 2.7 km to the east of the Site. MSDC does not currently operate any automatic (continuous) air quality monitoring stations.

NO_2 Air Quality Monitoring Survey

8.5.4 A three-month survey was carried out from late August to early December 2022 in line with TG22, using the method and at the locations described in **ES Volume 4, Appendix D1**. **Figure 8.1** presents the locations at which the survey was undertaken.

8.5.5 **Table 8.7** summarises the laboratory analysis unadjusted and annualised and bias adjusted NO_2 concentrations. As data were annualised against 2019 NO_2 concentrations, they are considered to have been adjusted against a 'normal' year unaffected by Covid-19. At all monitoring locations, the annual mean NO_2 AQO was not breached.

Table 8.7: Temple NO_2 Diffusion Tube Monitoring Survey Results

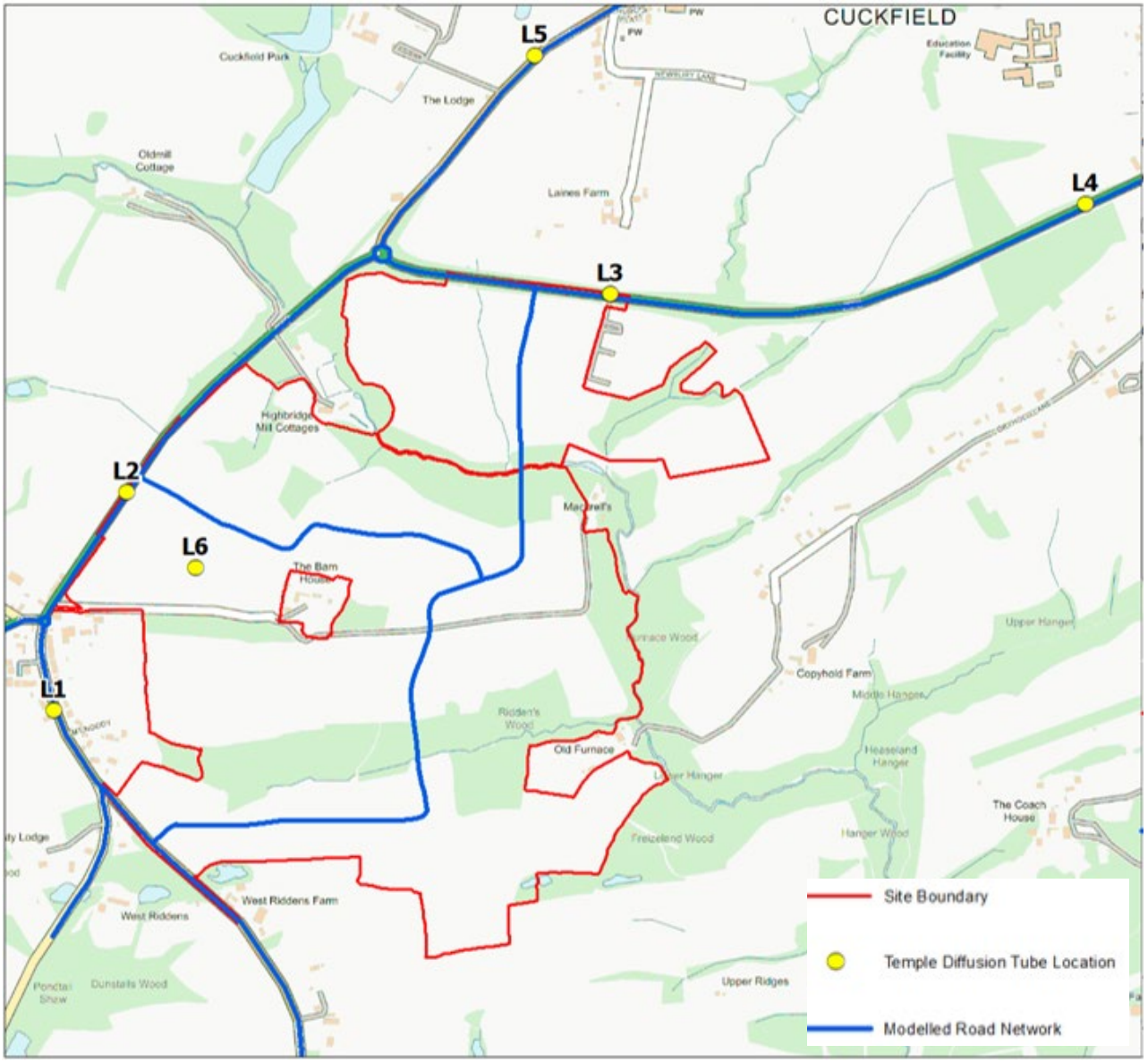
Site ID	Site Type	Site Location	Distance from Site (km)	Final mean (annualised and bias adjusted; µg/m³)
Location 1	Roadside	Cuckfield Road	0.1 km west	30.5

[22] Department for Environment, Food and Rural Affairs, n.d. UK AIR: Air Information Resource: AQMAs Interactive Map.

[23] MSDC. *Mid Sussex District Council Air Quality Annual Status Report for 2022.*

Site ID	Site Type	Site Location	Distance from Site (km)	Final mean (annualised and bias adjusted; µg/m³)
Location 2	Roadside	B2036 / A272 Cuckfield Road	0.01 km west	28.30
Location 3	Roadside	Opposite Cuckfield Sewage Treatment Works	0.03 km north	19.83
Location 4	Roadside	A272 near Tylers Green	0.7 km north-east	38.84
Location 5	Roadside	Eastern end of A272	0.4 km north	15.47
Location 6	Rural Background	B2036	On-site	12.94
Objective				**40**

Figure 8.1: Temple NO_2 Diffusion Tube Monitoring Survey Locations



temple

Estimated Background Data

8.5.6 Estimated background data are available from the UK-AIR website[24] operated by Defra. The website provides estimated annual average background concentrations of NO_2, PM_{10} and $PM_{2.5}$ on a 1 km^2 grid basis.

8.5.7 **Table 8.8** presents estimated annual average background NO_2, PM_{10} and $PM_{2.5}$ concentrations for the grid square containing the Site (529500, 123500) for the years 2019 (baseline year considered within this assessment) and 2030 (the furthest year into the future for which projections of air pollutants have been published).

8.5.8 The estimated background concentrations are well below the relevant AQOs for NO_2, PM_{10} and $PM_{2.5}$.

8.5.9 As background concentrations are predicted to fall with time, background concentrations in future years would not be expected to exceed their respective AQOs.

Table 8.8: Background pollutant concentrations at the Proposed Development from the UK-AIR website

Assessment Year	Estimated Annual Average Pollutant Concentrations Derived from the LAQM Support Website		
	Annual Average NO_2 ($\mu g/m^3$)	Annual Average PM_{10} ($\mu g/m^3$)	Annual Average $PM_{2.5}$ ($\mu g/m^3$)
2019	9.1	14.6	9.3
2030	6.5	13.5	8.5
AQO	**40**	**40**	**20**

Summary of Current and Future Baseline (Human Health)

8.5.10 According to the EPUK-IAQM guidance, the 24-hour mean PM_{10} AQO will not be exceeded unless the annual mean PM_{10} AQO exceeds ~31$\mu g/m^3$. TG22 indicates that exceedances of the hourly mean NO_2 AQO should not be excepted if annual mean NO_2 concentrations are below 60$\mu g/m^3$.

8.5.11 Based on the monitored and estimated background data presented above, it is considered that the Site is in an area where the NO_2, PM_{10} and $PM_{2.5}$ AQOs are unlikely to be exceeded.

8.5.12 Emissions of nitrogen oxides (NO_x), PM_{10} and $PM_{2.5}$ from vehicles are expected to decrease with time, as newer, less polluting vehicles replace older ones using local roads (although PM_{10} and $PM_{2.5}$ concentrations will eventually level off). As such, air quality by the Proposed Development's opening year (both during the year of first

[24] Department for Environment, Food and Rural Affairs, 2020. Background Mapping data for local authorities – 2018.

occupation; and thereafter as more of the scheme opens) expected to comply with all five AQOs at and around the Site.

Characterisation of Air Quality Impacts on Ecological Receptors

8.5.13 **Table 8.9** presents estimated annual average background NO_x and ammonia (NH_3) concentrations at the ecological receptors considered within assessment, as well as background rates of nutrient nitrogen deposition and acid deposition. These backgrounds were sourced from the Air Pollution Information System (APIS)[25] database, aside from the annual average NOx concentrations, which were derived from the UK-AIR website.

8.5.14 The concentrations of NH_3, nitrogen deposition and acid deposition represent the 2019 – 2021 average.

8.5.15 The estimated background annual average concentrations are well below the critical level for NO_x at all ecological receptors considered within the assessment; however, exceed the critical level at all receptors for NH_3.

8.5.16 The estimated annual background deposition rate exceeds the critical load for nutrient nitrogen deposition at all ecological receptors considered within the assessment and is below the maximum nitrogen critical load for acid deposition.

Table 8.9: Background pollutant concentrations applicable at the grid squares containing the Ancient Woodlands assessed

1km² grid within which each modelled receptor is located	Estimated Background Concentration				
	Annual Average NO_x (µg/m³)	Annual Nutrient N Deposition (kgN/ha/yr)	Acid Deposition		Annual Average NH_3 (µg/m³)
			Nitrogen Deposition (keq/ha⁻¹/year⁻¹)	Sulphur Deposition (keq/ha⁻¹/year⁻¹)	
529500,123500	8.29	22.57	1.61	0.17	1.27
530500,123500	8.06	22.84	1.63	0.17	1.29
529500,122500	8.24	22.53	1.61	0.16	1.27
528500,123500	8.12	22.3	1.59	0.16	1.28
529500,124500	7.93	22.61	1.62	0.17	1.27
530500,122500	7.87	22.81	1.63	0.17	1.28
Critical Level / Load	**30**	**10**	**3.125 – 3.169**	**-**	**1**

[25] Air Pollution Information System, 2023. *Air Pollution Information System.* Available from: https://www.apis.ac.uk/ [Accessed 29th September 2023].

Sensitive Receptors

8.5.17 There are several sensitive human receptors which may be affected by the Proposed Development during the construction and operational phases, including:

- Occupants of nearby dwellings and other places frequented by people within 200 m[26] of roads carrying traffic travelling to and from the Site, both whilst construction activities are ongoing and once operational;
- Users of nearby buildings or amenity space[27], which may experience a loss of amenity due to dust soiling, or whose health may be affected, as a result fugitive dust and pollutants such as NO_2 and PM_{10} generated by construction related activities or non-road mobile machinery (NRMM, i.e., plant); and,
- Future occupants of the Proposed Development, which may be affected by poor ambient air quality. Impacts here may be exacerbated by emissions of pollutants such as NO_2, PM_{10} and $PM_{2.5}$ generated both by road traffic and stationary combustion plant attributable to the Site once the Proposed Development is operational.

8.5.18 A search of the Multi-Agency Geographic Information for the Countryside (MAGIC) maps website[28] operated by Natural England indicates that there are no designated Special Areas of Conservation, Special Protection Areas, Ramsar Sites, Sites of Special Scientific Interest or National Nature Reserves in the vicinity (within 1,500 m) of the Site. However, the Blunts and Paiges Wood Local Nature Reserve is located approximately 1.3 km to the east of the Site; and there are Ancient Woodlands on-site and within the surrounding area. These locations have been included as ecological receptor locations in the qualitative construction dust assessment as well as the operational road emission assessment.

8.6 Identification and Description of Changes Likely to Generate Effect

Construction Phase

8.6.1 During the construction phase, construction activities have the potential to generate fugitive dust emissions which may give rise to annoyance due to the soiling of surfaces or which can damage vascular plant species. Emissions of this nature can also pose a risk of human health due to the increase in exposure to PM_{10} concentrations.

[26] This is based on the criteria from the 'LA105: Air quality' (Highways England et al., 2019) guidance regarding the maximum distance from roads which should be considered in an air dispersion modelling assessment.

[27] The IAQM 2023 guidance indicates that the requirement for a fugitive dust and emissions assessment can be screened out where the Proposed Development is located within 250 m of a Site boundary, or within 50 m of routes used by construction vehicles on the public highway, up to 500 m from the site entrance(s). These criteria are therefore considered to be the maximum distances over which fugitive dust and emissions from construction related activities could affect nearby receptors.

[28] Natural England, n.d. *Multi-Agency Geographic Information for the Countryside (MAGIC) website.*

8.6.2 Emissions from goods vehicles and vehicles used by Site personnel to travel to and from Site, as well as from NRMM, may also affect local air quality.

Operational Phase

8.6.3 Emissions from vehicles associated with the Proposed Development during the operational phase may affect local air quality. In addition, future users of the Proposed Development may be impacted upon by existing local air quality and odour from the Cuckfield WWTW.

8.7 Assessment of Likely Significant Effects

Construction Phase

Embedded Mitigation Measures

8.7.1 Any non-road mobile machinery used on-site which were purchased since the Non-Road Mobile Machinery Directive (97/68/EC)[29], including subsequent amendments[30], will comply with the emissions requirements specified in the relevant legislation.

8.7.2 Demolition and construction effects will be mitigated through the implementation of a Construction Logistics Plan (CLP) and Construction Environmental Management Plan (CEMP), where practicable (and for the purposes of best practice) including stipulating the absence of on-site parking, installing electric vehicle charge points on-site and encouraging staff to use public transport. This can be secured via a suitably worded planning condition. To ensure their effectiveness, it is recommended that they each also contain measures to ensure site personnel adhere to the requirements embedded therein; or that an equivalent mechanism is used.

8.7.3 As per the IAQM 2023 guidance, the dust assessment in **Section 8.7.4** onwards has been undertaken assuming no mitigation is implemented. However, the measures which are recommended to be included in the CEMP, a Dust Management Plan (DMP) or equivalent (determined in the following construction dust assessment) are listed in **Table 8.10** below. The measures should be implemented for as long as potentially dusty activities take place within a specific 'zone' or phase of Site works. Some of the measures may only be necessary during specific phases of work, or during activities with a high potential to produce dust, and the list should be refined and expanded upon in liaison with the construction contractor when producing the DMP or CEMP. The measures in italics within **Table 8.10** are classified as desirable in the IAQM 2023 guidance, the others being highly recommended.

[29] Directive 97/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery. European Commission.

[30] The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 transpose EU Regulation 2016/1628 (replacing emissions limits in 97/68/EC) into British law.

Table 8.10: List of mitigation measures relating to fugitive construction dust

Measure from the IAQM 2023 guidance
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 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.
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 logbook.
Hold regular liaison meetings with other high-risk construction sites within 500 m 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.
Carry out regular site inspections to monitor compliance with the DMP (as well as on roads where trackout may arise), 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 monitoring locations or similar with the local authority.
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 actives for an extensive period.
Avoid site runoff of water or mud.
Keep site fencing, barriers and 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.
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.

Measure from the IAQM 2023 guidance
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 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).
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.
Avoid bonfires and burning of waste materials.
Cover, seed, re-vegetate or fence stockpiles to prevent wind whipping to stabilise stockpiles, etc. as soon as practicable. Use Hessian, mulches or trackifiers 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.
Avoid scabbling (roughening of concrete surfaces) if possible.
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.
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
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.
Avoid dry sweeping of large areas.
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.

Measure from the IAQM 2023 guidance
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 10 m from receptors where possible.

Anticipated Effects – Construction Dust Screening Assessment

8.7.4 According to the IAQM 2023 guidance, an assessment of construction dust effects is normally required if there are human or ecological receptors within 250 m of locations where potentially dusty activities take place on-site, or within 50 m of routes expected to be used by demolition and construction vehicles on a public highway (where trackout could arise), up to 500 m from the Site entrance.

8.7.5 If these criteria are not met, it can be assumed that the level of risk from dust amenity will be negligible and any effects will be not significant.

8.7.6 As there are human receptors located within 250 m of the Site, a dust risk assessment has been undertaken.

8.7.7 The assessment has assumed that the entire Proposed Development would be built in one phase. This is because a detailed breakdown of construction related activities was not available; therefore, a worst-case assessment has been undertaken based on the assumption that the Proposed Development would be built out in one phase. This means that the dust emissions magnitude will be overestimated (assuming dust will be generated across the Site, not in distinct phases) whilst the receptor sensitivity will be underestimated (not accounting for on-site receptors). It is considered likely that the overall effects would be an overly conservative scenario because the potential for 'high' risk impacts would only arise where a high dust emissions magnitude is combined with a high dust sensitivity. However, the impact magnitudes in specific impact categories could increase (for example, the potential exists for the construction impact magnitude could rise from low to medium).

Anticipated Effects – Full Demolition and Construction Dust Qualitative Assessment

Dust Emissions Magnitude

8.7.8 The dust emission magnitudes for each of the four demolition and construction related activities (demolition, earthworks, construction and trackout) are informed by

the types of construction related activities expected to take place at the Site. These comprise:

- Demolition: No demolition is required.
- Earthworks: This will comprise excavation of foundations and service trenches, haulage, stockpiling, tipping, landscaping and remediation.
- Construction: The construction of the new residential-led, mixed-use buildings.
- Trackout: According to the IAQM 2023 guidance, trackout is defined as *"The transport of dust and dirt from the construction/ demolition site when HDVs leave the site (having travelled over muddy ground) onto the public road network, where it may be deposited and then re-suspended by vehicles using the network."* The anticipated trackout route to and from the Site will be via the A272 and B2036.

8.7.9 Potential dust emission magnitudes from each of the demolition and construction related activities has been assessed using the IAQM 2023 guidance criteria (**ES Volume 4, Appendix D1**), rather than the magnitudes of impact presented in **Chapter 3: EIA Methodology**, and are detailed in **Table 8.11**. Information is either derived from information provided by the Applicant or, where required, from appropriate reasonable assumptions.

Table 8.11: Dust Emission Magnitudes

Assessment Year	Description of site characteristics with reference to IAQM 2023 guidance criteria	Dust emissions magnitude
Demolition	No demolition required	N/A
Earthworks	Site area >110,000 m^2. Topsoil will be stripped and land re-profiled. Substructure works will involve bulk excavation for the building foundation. It is assumed that >10 heavy vehicles may be active at any one time.	Large
Construction	It is understood that some of the buildings will be made from bricks, with concrete frames. Building volume >75,000 m^3. Approximate quantum construction materials: • Foundation Concrete - 51,462 m^3 • Bricks - 162,240 m^3 • Concrete Blocks - 202,800 m^3 • Roof Tiles - 105,120 m^3	Large
Trackout	The maximum daily two-way vehicle movements during construction will be 75 vehicles per day, of which the number of HGVs will be 25 entering and leaving Site each day. Heavy goods vehicles could travel over >100m of unpaved ground on site.	Large

Receptor Sensitivity

8.7.10 **Table 8.12** outlines the sensitivity of the surrounding area determined in accordance with the IAQM 2023 guidance method, rather than the sensitivities of receptors presented in **Chapter 3: EIA Methodology**, summarised in **ES Volume 4, Appendix D1**.

8.7.11 As the Site as assessed as having a large trackout dust emissions magnitude, trackout was assumed to occur on applicable roads within 500 m of the likely Site exit, as per the IAQM 2023 guidance for a 'large' magnitude Site.

Table 8.12: Sensitivity of the surrounding area

Receptor	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	**High**: 10-100 high sensitivity receptors (residential properties) less than 20 m of the Site boundary.	**Low**: 1-10 high sensitivity receptors less than 50m of areas where construction activities will take place.	**Medium**: 10-100 high sensitivity receptors within 50 m of roads within 500m of site entrances.
Human Health Impacts	N/A	**Low**: 10-100 high sensitivity receptors less than 20m of the Site boundary and local annual mean PM_{10} concentrations lower than 24µg/m^3.	**Low**: 1-10 high sensitivity receptors less than 50m of areas where construction activities will take place.	**Low**: 10-100 sensitivity receptors within 50 m of roads within 500m of site entrances and local annual mean PM_{10} concentrations lower than 24µg/m^3.
Ecological	N/A	**Medium:** A search of the Multi-Agency Geographic Information for the Countryside (MAGIC) maps website operated by Natural England indicates that there are ancient woodlands located inside and within 20 m the Site boundary, as well as within 20 m of the routes along which trackout may occur.		

Dust Impact Risk

8.7.12 The demolition and construction dust risks shown in **Table 8.13** have been assigned based on the dust emission magnitude associated with each on-site activity and the sensitivity of the surrounding area, using the IAQM 2023 guidance method, rather than the magnitudes of impact presented in **Chapter 3: EIA Methodology**, described in **ES Volume 4, Appendix D1**.

Table 8.13: Summary of the dust risk from site activities

Potential Impact	Risk of Dust Impacts			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	High	Low	Medium
Human Health	N/A	Low	Low	Low
Ecological	N/A	Medium	Medium	Medium

8.7.13 The overall dust risk from the Site is predicted to be a maximum of high.

8.7.14 Based on the 'high' dust impact risks above, it is considered that fugitive dust could have a maximum of likely 'large' secondary, local, temporary effects in the absence of mitigation. The significance of effect would be less for human health and impact on ecosystems.

8.7.15 Appropriate mitigation measures will help to negate most of the potential negative air quality impacts resulting from the construction phase of the Proposed Development and will avoid significant dust effects.

Operational Phase

Embedded Mitigation Measures

8.7.16 The following measures incorporated into the Proposed Development will reduce potential adverse air quality effects in relation to on-site sources of combustion locally. This could be secured by a suitably worded planning condition:

- The Proposed Development will be reliant on Air and Ground Source Heat Pumps to meet its heating, cooling and hot water demands.

8.7.17 The following measures are recommended to be implemented where practicable, to reduce the volume of emissions from internal combustion engines, and/or facilitate modal shift, on the local road network. These measures would assist in mitigating air quality effects:

- Internalised and Sustainable Trips – The Proposed Development is mixed-use, containing both residential development as well as non-residential development, including local centre uses and a primary school. The mixed-use nature of the Proposed Development enables future residents to meet many of their basic needs within the Site, resulting in a high likelihood of regular internalised trips and subsequently a reduced impact on the wider road network near existing receptors;
- Existing Public Rights of Way – The Proposed Development benefits from a series of Public Rights of Way (PRoWs) which are present within the Site itself and in the surrounding area, including Bridleways, Footpaths and formal cycle routes. These may assist in preventing trips being made by fossil fuel powered vehicles;

- Internal active transport routes – The Proposed Development includes an active travel network for pedestrian and cyclists throughout the Site, as well as providing connections into the surrounding pedestrian and cycle network, enabling future residents to travel by sustainable modes of transport around the Site and into Ansty;
- Proposed Bus Routing – The Proposed Development has been designed to enable a bus route[31] to enter and exit the Site, allowing for future residents to travel to more distant locations via sustainable modes of transport. This is likely to reduce the extent of trips made in private fossil fuel powered vehicles;
- A travel plan will be implemented, facilitating modal shift. To accord with the AQEG 2021 guidance, it is recommended where practicable that the travel plan and its implementation meet the requirements in applicable West Sussex County Council guidance'[32];
- Electric vehicle charge points will be installed to accord with at least the minimum requirements in Approved Document S[33]. To accord with the recommendations from the AQEG 2021 guidance, it is recommended where practicable that the charge points meet the requirements in the 'West Sussex County Council Guidance on Parking at New Developments (September 2020)'[34];

8.7.18 The Proposed Development masterplan was informed by the results of odour assessment work completed to date by May 2023.

Anticipated Effects

Impacts of the Proposed Development on Local Air Quality – Human Receptors

8.7.19 **Table 8.14** presents the predicted annual mean NO_2 concentrations at each of the existing receptor locations, shown in **Figure 8.2** and **Figure 8.3**. It also shows the percentage change in pollutant concentrations (with the Proposed Development) relative to the AQAL (i.e. the annual mean AQO), the pollutant concentration as a percentage of the AQAL, and the assigned EPUK-IAQM guidance impact description.

[31] At the time of writing, it remains unknown whether the proposed bus service would be provided on-demand, as a public service, or a combination. The air quality benefits would be experienced only where the bus service provided results in a net reduction in emissions.

[32] The AQEG 2021 guidance links to the WSCC webpage from where their guidance can be provided on request: West Sussex County Council, n.d. *Travel Plan Resources.* Available from: https://www.westsussex.gov.uk/roads-and-travel/travel-and-public-transport/travelwise-sustainable-transport/travel-plans/travel-plan-resources/ [Accessed 29th September 2023].

[33] Department for Levelling Up, Housing and Communities, 2023. Infrastructure for charging electric vehicles: Approved Document S.

[34] West Sussex County Council, 2020. Guidance on Parking at New Developments. Available from: https://www.westsussex.gov.uk/media/1847/guidance_parking_res_dev.pdf [Accessed 29th September 2023].

Figure 8.2: Roads and existing human receptors included in the modelling assessment – near Site (Ansty village)

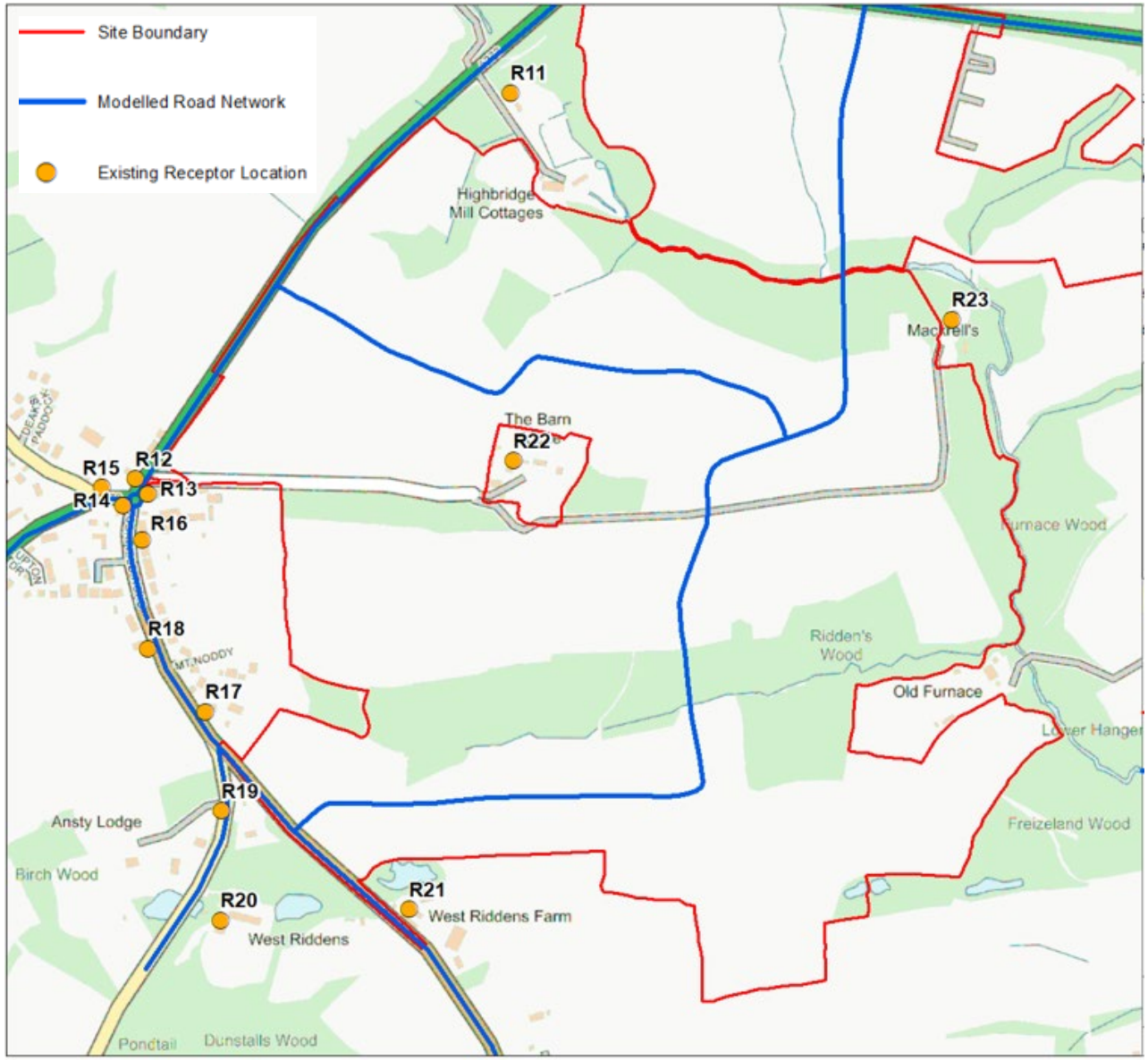


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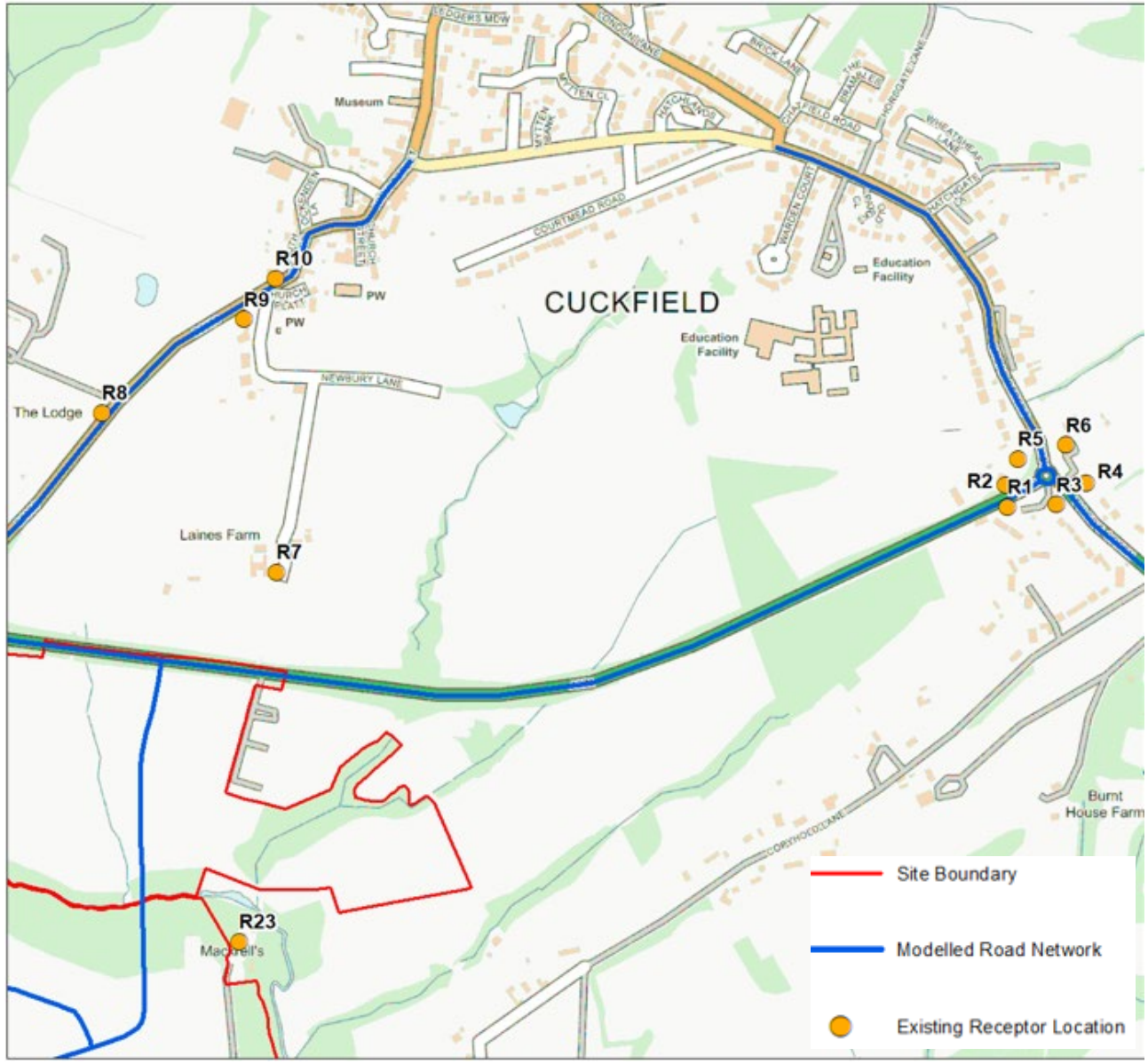
Figure 8.3: Roads and existing human receptors included in the modelling assessment (Cuckfield)



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8.7.20 **Table 8.14** shows that the annual mean NO_2 concentrations are not predicted to exceed the annual mean NO_2 AQO at all modelled existing receptors in either scenario.

8.7.21 The largest change in annual mean NO_2 concentrations at annual mean sensitive receptors was 0.7µg/m^3 increase relative to the AQO. As per the EPUK-IAQM guidance assessment method, the impact of the Proposed Development on air quality was assessed as negligible at each of the relevant modelled receptors.

8.7.22 None of the existing receptors modelled are exposed to annual mean NO_2 concentrations exceeding 60µg/m^3 with the Proposed Development in place, where they did not already exceed 60µg/m^3 without the Proposed Development in place. Therefore, in accordance with TG22, the one-hour mean objective is unlikely to be exceeded as a direct result of traffic generated by the Proposed Development.

Table 8.14: Predicted annual mean NO_2 at modelled existing receptors (operational phase) and assessment of impact magnitude in accordance with the EPUK-IAQM guidance method

Receptor ID	Without Development (S2)	With Development (S3)	Actual Change	% of AQAL	EPUK-IAQM Impact descriptor
R1	13.2	13.4	0.2	33.5	Negligible
R2	11.9	12.0	0.1	30.0	Negligible
R3	13.4	13.6	0.2	34.0	Negligible
R4	12.9	13.1	0.2	32.8	Negligible
R5	10.5	10.6	0.1	26.5	Negligible
R6	10.7	10.8	0.1	27.0	Negligible
R7	7.4	7.5	0.1	18.8	Negligible
R8	8.9	9.3	0.4	23.3	Negligible
R9	8.2	8.5	0.3	21.3	Negligible
R10	9.9	10.6	0.7	26.5	Negligible
R11	8.6	8.6	0.0	21.5	Negligible
R12	15.7	16.1	0.4	40.3	Negligible
R13	19.1	19.5	0.4	48.8	Negligible
R14	19.9	20.3	0.4	50.8	Negligible
R15	13.2	13.5	0.3	33.8	Negligible
R16	12.1	12.1	0.0	30.3	Negligible
R17	10.8	10.7	-0.1	26.8	Negligible
R18	10.2	10.1	-0.1	25.3	Negligible
R19	9.3	10.0	0.7	25.0	Negligible
R20	7.3	7.6	0.3	19.0	Negligible
R21	8.2	8.4	0.2	21.0	Negligible

Receptor ID	Without Development (S2)	With Development (S3)	Actual Change	% of AQAL	EPUK-IAQM Impact descriptor
R22	6.9	7.1	0.2	17.8	Negligible
R23	6.6	6.8	0.2	17.0	Negligible

8.7.23 **Table 8.15** presents the predicted annual mean PM_{10} concentrations at each of the existing receptor locations. It also shows the percentage change in pollutant concentrations (with the Proposed Development) relative to the AQAL (i.e. the annual mean AQO), the pollutant concentration as a percentage of the AQAL, and the assigned EPUK-IAQM guidance impact descriptor.

8.7.24 **Table 8.15** shows that the annual mean PM_{10} concentrations are not predicted to exceed the annual mean PM_{10} AQO at all modelled existing receptors in either scenario.

8.7.25 The largest change in annual mean concentrations was a 0.3µg/m^3 increase relative to the AQO. As per the EPUK-IAQM guidance assessment method, the impact of the Proposed Development on air quality was assessed as negligible at the modelled receptors sensitive to changes in annual mean PM_{10} concentrations.

8.7.26 As the largest concentration was below the ~31µg/m^3 annual mean PM_{10} concentration which can be expected prior to the 50µg/m^3 24-hour mean AQO threshold being exceeded on more than the 35 occasions permissible per annum, the Proposed Development is not expected to affect 24-hour mean PM_{10} concentrations.

Table 8.15: Predicted annual mean PM_{10} at modelled existing receptors (operational phase) and assessment of impact magnitude in accordance with the EPUK-IAQM guidance method

Receptor ID	Without Development (S2)	With Development (S3)	Actual Change	% of AQAL	EPUK-IAQM Impact descriptor
R1	15.2	15.3	0.1	38.3	Negligible
R2	14.6	14.7	0.0	36.6	Negligible
R3	15.0	15.1	0.1	37.8	Negligible
R4	14.9	14.9	0.0	37.3	Negligible
R5	14.0	14.0	0.0	35.0	Negligible
R6	14.1	14.1	0.0	35.3	Negligible
R7	13.0	13.1	0.1	32.8	Negligible
R8	13.7	13.9	0.2	34.8	Negligible
R9	13.4	13.5	0.1	33.8	Negligible
R10	14.0	14.3	0.3	35.8	Negligible
R11	14.4	14.4	0.0	36.0	Negligible
R12	16.8	16.9	0.1	42.3	Negligible

Receptor ID	Without Development (S2)	With Development (S3)	Actual Change	% of AQAL	EPUK-IAQM Impact descriptor
R13	18.0	18.0	0.0	45.0	Negligible
R14	18.3	18.4	0.1	46.0	Negligible
R15	16.0	16.1	0.1	40.3	Negligible
R16	15.6	15.5	-0.1	38.8	Negligible
R17	15.3	15.2	-0.1	38.0	Negligible
R18	15.0	15.0	0.0	37.5	Negligible
R19	14.2	14.4	0.2	36.0	Negligible
R20	13.5	13.5	0.0	33.8	Negligible
R21	13.8	13.9	0.1	34.8	Negligible
R22	13.7	13.8	0.1	34.5	Negligible
R23	13.1	13.1	0.1	32.9	Negligible

8.7.27 **Table 8.16** presents the predicted annual mean $PM_{2.5}$ concentrations at each of the existing receptor locations to which the annual and hourly mean AQOs should be applied in S4 and S5. It also shows the percentage change in pollutant concentrations (with the Proposed Development) relative to the AQAL (i.e. the annual mean AQO), the S5 pollutant concentration as a percentage of the AQAL, and the assigned EPUK-IAQM guidance impact descriptor.

8.7.28 It shows that the annual mean $PM_{2.5}$ concentrations are not predicted to exceed the annual mean $PM_{2.5}$ AQO at any of the relevant modelled receptors in both S2 and S3.

8.7.29 The largest change in annual mean concentrations was 0.1µg/m^3 increase relative to the AQO. As per the EPUK-IAQM guidance assessment method, the impact of the Proposed Development on air quality was assessed as negligible at the relevant modelled receptors.

Table 8.16: Predicted annual mean $PM_{2.5}$ at modelled existing receptors (operation phase) and assessment of impact magnitude in accordance with the EPUK-IAQM guidance method

Receptor ID	Without Development (S2)	With Development (S3)	Actual Change	% of AQAL	EPUK-IAQM Impact descriptor
R1	9.9	10.0	0.1	49.8	Negligible
R2	9.6	9.6	0.0	48.1	Negligible
R3	9.8	9.9	0.1	49.4	Negligible
R4	9.7	9.8	0.1	48.8	Negligible
R5	9.3	9.3	0.0	46.3	Negligible
R6	9.3	9.3	0.0	46.4	Negligible
R7	8.6	8.6	0.0	42.9	Negligible

Receptor ID	**Without Development (S2)**	**With Development (S3)**	**Actual Change**	**% of AQAL**	**EPUK-IAQM Impact descriptor**
R8	8.8	8.9	0.1	44.7	Negligible
R9	8.8	8.8	0.0	44.2	Negligible
R10	9.2	9.3	0.1	46.4	Negligible
R11	9.0	9.0	0.0	44.9	Negligible
R12	10.4	10.5	0.1	52.5	Negligible
R13	11.1	11.1	0.0	55.7	Negligible
R14	11.3	11.3	0.0	56.7	Negligible
R15	10.0	10.0	0.0	50.0	Negligible
R16	9.7	9.6	-0.1	48.2	Negligible
R17	9.5	9.5	0.0	47.3	Negligible
R18	9.4	9.3	-0.1	46.7	Negligible
R19	9.0	9.1	0.1	45.6	Negligible
R20	8.6	8.6	0.0	43.0	Negligible
R21	8.8	8.8	0.0	44.1	Negligible
R22	8.6	8.6	0.0	43.2	Negligible
R23	8.4	8.5	0.1	42.3	Negligible

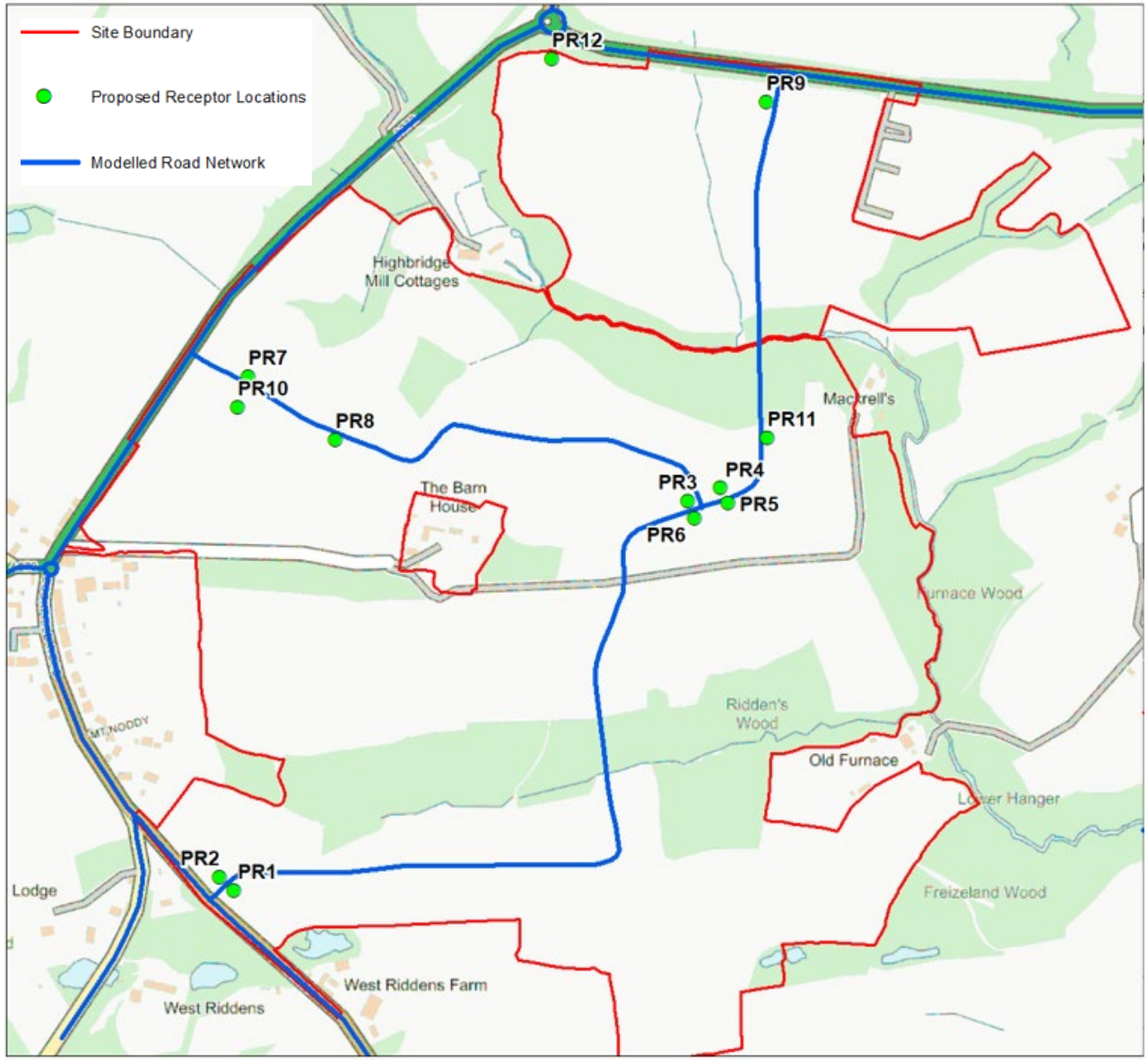
8.7.30 Based on the EPUK-IAQM guidance, the change in annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations associated with operation of the Proposed Development results in the air quality impact being classified as negligible for all modelled receptors. For these reasons, the effect of emissions connected with operational vehicle movements on local air quality is therefore considered likely to have indirect, local, temporary effects of **negligible** significance.

Impacts of Ambient Air Quality on Future Site Users

8.7.31 The future operational year modelling results for NO_2, PM_{10} and $PM_{2.5}$ concentrations at each modelled proposed receptor are presented in **Table 8.17**. The proposed receptor locations are presented in **Figure 8.4**.

8.7.32 It shows that the on-site modelled pollution concentrations are all well below the annual mean NO_2, PM_{10} and $PM_{2.5}$ AQOs. As the annal mean PM_{10} concentrations were also below ~31µg/m^3, the 24-hour mean PM_{10} AQO (50µg/m^3) would not be breached more than the permissible 35 days per annum. None of the proposed receptors modelled are predicted to be exposed to annual mean NO_2 concentrations exceeding 60µg/m^3. Therefore, in accordance with TG22, the one-hour mean objective is unlikely to be exceeded.

Figure 8.4: Roads and proposed human receptors included in the modelling assessment



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8.7.33 The effect of ambient air quality on future Site users once the Proposed Development is operational are considered to be indirect, local, permanent effects of **negligible** significance.

Table 8.17: Estimated annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations at proposed receptors (µg/m^3) for S3

Receptor ID	NO_2	PM_{10}	$PM_{2.5}$
PR1	10.6	15.8	9.9
PR2	10.9	15.2	9.5
PR3	8.6	15.1	9.4
PR4	7.9	14.3	9.1
PR5	8.5	14.1	9.0
PR6	8.1	14.5	9.1
PR7	10.1	14.4	9.0
PR8	8.8	14.3	9.0
PR9	10.2	13.7	8.8
PR10	8.7	14.2	8.9
PR11	8.1	13.6	8.7
PR12	10.1	14.1	8.8

Impacts of the Proposed Development on Local Air Quality – Ecological Receptors

8.7.34 **ES Volume 4, Appendix D4, Table D.15** presents the annual mean NOx and NH_3 concentrations; nitrogen deposition and acid deposition and compares the Proposed Development contribution to the relevant critical level or load.

8.7.35 For each Ancient Woodland site (E1 to E10, shown in **Figure D.7** to **Figure D.13** within **ES Volume 4, Appendix D4**), receptors were modelled in a transect, starting at the boundary of the Ancient Woodland closest to the road, and at a distance of 10 m thereafter. Individual receptor points were also modelled at three points in site E7; and at E5 in place of a transect.

8.7.36 Annual mean NOx concentrations did not breach the 30µg/m^3 AQO at any of the ecological receptor locations in both S2 and S3, except at E9 (at the woodland boundary, 4m from the road). The process contribution (PC) exceeded 1% of the critical level at the following locations:

- E3, from its site boundary to 130 m from the road (where the transect was modelled);
- E6, from its site boundary to 60 m from the road (where the transect was modelled);
- E7, from its site boundary to 30 m from the road (where the transect was modelled); and,

- E8, E9 and E10, from their site boundaries to 20 m from the road (where the transect was modelled).

8.7.37 Annual mean NH_3 concentrations breached the 1µg/m^3 critical level at all of the modelled ecological receptor locations, due to its concentrations in background. The PC exceeded 1% of the critical level at the following locations:

- E3, from its site boundary to 90 m from the road (where the transect was modelled);
- E7, from its site boundary to 20 m from the road (where the transect was modelled); and,
- E8, E9 and E10, from their site boundaries to 20 m from the road (where the transect was modelled).

8.7.38 In relation to the impacts of nitrogen and ammonia (combined) on nutrient loading in the Ancient Woodlands, the Proposed Development contributed >1% of the lower critical load at the following locations:

- E3, from its site boundary to 130 m from the road (where the transect was modelled);
- E4, at its site boundary 131 m from the road (where the transect was modelled);
- E6, from its site boundary to 70 m from the road (where the transect was modelled);
- E7, from its site boundary to 40 m from the road (where the transect was modelled); as well as at individual receptor location E7C and,
- E8, E9 and E10, from their site boundaries to 30 m from the road (where the transect was modelled).

8.7.39 In relation to the impacts of nitrogen and ammonia (combined) on acid deposition in the Ancient Woodlands, the Proposed Development contributed >1% of the lower critical load at E7, 2.7 m from the road.

8.7.40 The significance of these breaches of the critical levels and loads has been assessed by the project's ecologists in **Chapter 11: Ecology and Biodiversity** and is not considered further in this chapter.

Impacts of Odour on Future Site Users

8.7.41 Olfactometric sniff testing was undertaken as part of the odour assessment between April and June 2023 at various located to the west and south-west of the Cuckfield WWTW. There were three moderate adverse odour impacts on the proposed sports pitches (out of 39 tests). The odour impacts would be not significant. The results of the sniff tests are shown in **Table 8.18** below.

Table 8.18: Results of the first survey and assessment of impact magnitude connected to each type of observation (assumed medium receptor sensitivity)

Date	Point	Description	Average Intensity (I) from source	Pervasiveness of relevant odour (I≥4) (%)	Odour Exposure	Odour Impact
04/04/2023	1,1	Sewage or ammonia	1	0	Negligible	Negligible
04/04/2023	1,2	Sewage or ammonia	2	23	Medium	Slight adverse
04/04/2023	1,3	Sewage or ammonia	3	30	Medium	Slight adverse
04/04/2023	1,4	Sewage or ammonia	4	67	Large	**Moderate adverse**
04/04/2023	1,5	Sewage or ammonia	4	67	Large	**Moderate adverse**
04/04/2023	1,6	Sewage or ammonia	2	67	Medium	Slight adverse
04/04/2023	1,7	Sewage or ammonia	1	0	Negligible	Negligible
04/04/2023	1,8	Sewage	3	57	Medium	Slight adverse
04/04/2023	1,10	Sewage	1	0	Negligible	Negligible
04/04/2023	1,11	Sewage	2	0	Negligible	Negligible
17/04/2023	2,12	Sewage	2	6	Negligible	Negligible
17/04/2023	2,13	Sewage	2	10	Small	Negligible
17/04/2023	2,14	Sewage	2	16	Small	Negligible
17/04/2023	2,15	Sewage	1	0	Negligible	Negligible
17/04/2023	2,16	Sewage	2	7	Negligible	Negligible
17/04/2023	2,17	Sewage	1	10	Error	Negligible
17/04/2023	2,18	Sewage	2	17	Small	Negligible
17/04/2023	2,19	Sewage	3	23	Medium	Slight adverse
17/04/2023	2,20	Sewage	3	20	Medium	Slight adverse
17/04/2023	2,21	Sewage	3	13	Medium	Slight adverse
17/04/2023	2,22	Sewage	3	34	Medium	Slight adverse
17/04/2023	2,23	Sewage	3	47	Medium	Slight adverse

Date	Point	Description	Average Intensity (I) from source	Pervasiveness of relevant odour (I≥4) (%)	Odour Exposure	Odour Impact
17/04/2023	2,24	Sewage	3	45	Medium	Slight adverse
23/05/2023	3,1	Sewage	2	23	Medium	Slight adverse
23/05/2023	3,2	Unsure: assumed potentially vegetation	N/A	N/A	N/A	None
23/05/2023	3,3	Sewage	3	60	Medium	Slight adverse
23/05/2023	3,4	Sewage	3	17	Medium	Slight adverse
23/05/2023	3,5	Sewage	4	60	Large	**Moderate adverse**
23/05/2023	3,6	No odour from sewage detected	N/A	N/A	N/A	None
23/05/2023	3,7	Sewage	2	14	Small	Negligible
23/05/2023	3,8	Sewage*	2	0	Negligible	Negligible
23/05/2023	3,10	Sewage	3	27	Medium	Slight adverse
23/05/2023	3,11	Sewage	2	7	Negligible	Negligible
23/05/2023	3,12	Sewage	2	3	Negligible	Negligible
23/05/2023	3,13	Sewage	2	10	Small	Negligible
06/06/2023	4,1	Sewage or potentially sewage	2	4	Negligible	Negligible
06/06/2023	4,5	Sewage	2	9	Negligible	Negligible
06/06/2023	4,11	Sewage	2	0	Negligible	Negligible
06/06/2023	4,12	Sewage	2	7	Negligible	Negligible
06/06/2023	4,13	Sewage	3	17	Medium	Slight adverse
06/06/2023	4,14	Sewage	2	17	Small	Negligible

8.7.42 The detailed dispersion modelling assessment shows that receptors at the Site do not exceed assessment criterion. The highest concentrations are located at the proposed sports facilities which have a medium sensitivity to odour. Therefore, the maximum impact from WWTW is slight adverse; this is not significant. The C_{98}, 1 hour odour concentrations predicted at the receptors modelled at the Site are presented in **Table**

8.19 below, which also describes the impact magnitude at each assessed receptor location in accordance with the IAQM 2018 guidance.

Table 8.18: C_{98}, 1-hour odour concentrations at modelled discrete receptors and assessment of impact magnitude in accordance with the IAQM 2018 guidance

Receptor ID	Odour Concentration C_{98}, 1 hour (OU_E/m^3)						Receptor Sensitivity	Odour Impact Magnitude
	2017	2018	2019	2020	2021	Max		
F1	1.3	1.3	1.2	1.3	0.9	1.3	Medium	Negligible
F2	1.5	1.6	1.8	1.0	1.3	1.8	Medium	Slight
R1	0.4	0.4	0.4	0.3	0.5	0.5	High	Negligible
R2	0.3	0.4	0.4	0.2	0.2	0.4	High	Negligible
R3	0.2	0.3	0.3	0.2	0.3	0.3	High	Negligible
R4	0.2	0.2	0.3	0.1	0.2	0.3	High	Negligible
R5	0.1	0.1	0.1	0.0	0.1	0.1	High	Negligible
R6	0.0	0.0	0.0	0.0	0.0	0.0	High	Negligible
R7	0.1	0.1	0.1	0.0	0.1	0.1	High	Negligible

8.7.43 In light of the above, this assessment has concluded that future Site users of the Proposed Development would not be exposed to odour concentrations exceeding prevailing assessment thresholds and amenity on-site would be acceptable.

8.8 Scope for Additional Mitigation Measures

Potential Additional Mitigation Measures

Mitigation Measures for Construction Dust

8.8.1 Additional mitigation (beyond embedded measures) is not considered to be required, owing to the insignificant effects which emissions from demolition and construction vehicles are expected to have on local air quality.

Mitigation Measures for Construction Plant and Traffic

8.8.2 Additional mitigation (beyond embedded measures) is not considered to be required, owing to the relatively small impact which construction vehicle movements and plant will have on air quality.

Mitigation Measures for Operational Phase Effects on Local Air Quality

8.8.3 The Proposed Development is not expected to have significant adverse effects on local air quality in relation to human health. Measures from the AQEG 2021 guidance have been recommended as embedded mitigation.

8.8.4 The Proposed Development is not expected to introduce receptors into an area of poor ambient air quality or odour (in relation to the Cuckfield WWTW) and, as such, no mitigation has been recommended.

8.9 Residual Effects

8.9.1 The likely residual effect of fugitive dust and emissions undertaken during the construction phase on local air quality can be considered as '**negligible**' (i.e. 'not significant'), with occasional **minor adverse** effects during particularly dry, hot periods.

8.9.2 The likely residual effect of emissions from vehicle movements generated both by construction related activities attributable to the Proposed Development, or once it is operational, with regard to their impact on human receptors, is considered to be **'negligible'** (i.e. 'not significant').

8.9.3 Based on the submitted outline plans, the Proposed Development would not exposure future Site users into an area where air quality or odour from the Cuckfield WWTW would have significant impacts.

8.10 Cumulative Effects

8.10.1 Cumulative effects are the combined effects of several development schemes (in conjunction with the Proposed Development) which may, on an individual basis be insignificant but, cumulatively, have a significant effect.

8.10.2 The ES has given consideration to 'Cumulative 'Effects' for schemes located within a 5 km radius from the boundary of the Site, as listed in **ES Volume 2, Chapter 3: EIA Methodology**.

8.10.3 It is anticipated that all demolition and construction sites will adopt appropriate mitigation measures to limit emissions of dust and emissions and will hold the liaison meetings recommended above to coordinate / consolidate dust management practices. With these measures in place, cumulative demolition and construction related activities are expected to have a 'not significant' effect on these receptors.

8.10.4 Committed and consented schemes are embedded in the future year scenarios used to account for the impacts of the Proposed Development on air quality at human receptors. As the EPUK-IAQM guidance criteria consider the combined impacts of baseline air quality (inclusive of background and modelled road contribution) as well as the impact of the Proposed Development itself, the air quality assessment is inherently cumulative.

8.10.5 There are no known sources of odour in the vicinity of the Site (other than the Cuckfield WWTW), such that cumulative odour is not anticipated.

8.11 Summary and Conclusions

8.11.1 Air quality at the Site and surrounding environs is generally good and will likely improve over time.

8.11.2 This chapter of the ES reviewed existing air quality within the study area and assessed the potential effect of the Proposed Development on air quality at existing and proposed sensitive receptors. The effects of dust deposition during the construction phase were also considered, as were the effects of odour generated in connection with the nearby Cuckfield WWTW on future Site users.

8.11.3 Fugitive dust from demolition and construction related activities was assessed as having a maximum dust risk of high, for earthworks; and medium, for trackout. These medium and high risks were assessed as having a potentially significant effect. Mitigation measures are proposed to be implemented. With these mitigation measures in place, residual effects on receptors are likely to be negligible, with possible short-term minor adverse effects during adverse weather conditions.

8.11.4 The assessment of emissions associated with construction vehicle movements has been screened out of assessment.

8.11.5 The assessment of effects when the Proposed Development is fully operational has been assessed as being not significant, regarding the impacts on human receptors. Future Site users of the Proposed Development were not predicted to be exposed to poor air quality when the entire Proposed Development becomes operational. Mitigation measures are embedded to mitigate impacts.

8.11.6 As outlined in **ES Volume 4, Appendix D5**, the effect of odour on future Site users is considered to be not significant.

8.11.7 **Table 8.18** summarises the topic effects resulting from the Proposed Development.

Table 8.20: Summary of Residual Effects

Receptor/ Affected Group	Value or Sensitivity (Significance) of Receptor	Activity or Impact	Embedded Design Mitigation	Magnitude/ Spatial Extent/ Duration/ Likelihood of Occurrence	Significance of effect	Additional Mitigation	Residual Magnitude of Impact	Significance of Residual effect
Construction								
Human and ecological receptors affected by dust deposition from construction activities	High (maximum)	Fugitive dust and emissions in connection with earthworks, construction and trackout	Dust mitigation measures from CEMP, including best practice measures from the IAQM 2023 guidance	Large (maximum) Direct Local Temporary Likely	Major (maximum, as assessed in the absence of mitigation in accordance with the IAQM 2023 guidance)	None	Negligible to minor adverse	Minor Adverse
Human health (construction vehicle emissions)	High (maximum)	Movement of vehicles and plant whilst construction activities are ongoing	Measures controlling vehicle and plant emissions	Negligible Indirect Local Temporary Likely	Negligible	None	Negligible	Negligible
Operation								
Human health	High (maximum)	Movement of vehicles from	Measures reducing vehicle	Negligible Indirect Local	Negligible	None	Negligible	Negligible

Receptor/ Affected Group	Value or Sensitivity (Significance) of Receptor	Activity or Impact	Embedded Design Mitigation	Magnitude/ Spatial Extent/ Duration/ Likelihood of Occurrence	Significance of effect	Additional Mitigation	Residual Magnitude of Impact	Significance of Residual effect
(vehicle emissions)		future Site users	emissions. No combustion sources for heating.	Permanent Likely				
Human health (Impacts of ambient air quality on future site users)	High (maximum)	Future year road traffic emissions	None	Negligible Indirect Local Permanent Likely	Negligible	None	Negligible	Negligible
Disamenity due to odour from WWTW – impacts on future Site users	High (maximum)	Future operation of WWTW	Masterplan designed to locate residences away from WWTW	Negligible Direct Local Permanent Likely	Negligible	None	Negligible	Negligible
Cumulative Effects – Construction								
Receptors affected by dust deposition	**Not applicable:** There are no cumulative schemes in close enough vicinity to be considered, either as sources or receptors.							

Receptor/ Affected Group	Value or Sensitivity (Significance) of Receptor	Activity or Impact	Embedded Design Mitigation	Magnitude/ Spatial Extent/ Duration/ Likelihood of Occurrence	Significance of effect	Additional Mitigation	Residual Magnitude of Impact	Significance of Residual effect
from construction activities								
Human health (construction vehicle emissions)	**Not applicable:** This has not been assessed, as the impacts of the Proposed Development on local air quality were screened out of further assessment in relation to plant and construction vehicle movements.							
Cumulative Effects – Operation								
Human health (vehicle emissions)	**Not applicable:** The effects of cumulative schemes are inherently considered within the traffic data provided and so will not differ from those listed above, both regarding the assessment of existing and proposed human receptors.							
Disamenity due to odour from WWTW – impacts on future Site users	**Not Applicable:** There are no known sources of odour in the vicinity of the Site (other than the Cuckfield WWTW), such that cumulative odour is not anticipated.							