Land To the North of High Bar Lane, Thakeham
West Sussex

Air Quality Technical Note

Date of report: November 2026

savills

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Document History

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1. Introduction

1.1 Background

1.1.1 This Air Quality Technical Note has been prepared in response to comments received from the Horsham District Council (HDC) Environmental Health officer regarding a letter issued by Savills regarding the discharge of Schedule 5 (Air Quality Management Plan) of the Section 106 Agreement associated with planning permission DC/23/2152 (as varied by DC/26/0209). The letter issued in September 2026 outlined that there would be no material changes to the proposed development and that the air quality assessment submitted in November 2023 remains valid.

1.1.2 The Environmental Health consultation response confirmed that a new Air Quality Assessment (AQA) is not considered necessary given the scale of the development and the findings of the approved assessment. However, HDC requested confirmation that the Air Quality Management Plan (AQMP) (proposed mitigation measures presented as Appendix B of the 2023 submitted AQA) has been reviewed against current air quality guidance and that appropriate and proportionate measures to minimise emissions and exposure have been incorporated. The response also confirmed that the Air Quality Offset Contribution was agreed through the S106 agreement and that no further comments regarding the contribution amount are raised. The AQA completed in November 2023 is available in Appendix A, and the comments received from HDC consultation are available in Appendix B.

1.2 Purpose

1.2.1 The purpose of this Air Quality Technical Note is to review the AQMP against the current air quality planning guidance, including guidance relating to $PM_{2.5}$ and the updated Sussex Air Quality and Emissions Mitigation Guidance (Sussex-air Quality Partnership, 2026). The note considers whether the mitigation measures secured through the development remain appropriate and proportionate in the context of current guidance and whether any additional measures are required.

2. Review of AQA and AQMP

2.1 Overview

2.1.1 The proposed mitigation measures outlined within the November 2023 AQA (forming the AQMP) have been reviewed against current guidance relating to construction dust, $PM_{2.5}$ and the updated Sussex Air Quality and Emissions Mitigation Guidance (Sussex-air Quality Partnership, 2026).

2.2 Mitigation Measures

2.2.1 The IAQM's 2023 Construction Dust Guidance (IAQM, 2023) was utilised in the AQA submitted in November 2023, to assess the potential impacts of dust during the construction phase of the proposed development. The IAQM guidance provides an evaluation matrix to determine the potential risk of dust generation and the associated level of mitigation required.

2.2.2 As set out in the submitted AQA, the potential impact on dust soiling and human health were conservatively treated as being of "high risk" in order to identify mitigation measures for the worst-case scenario and apply those measures that constitute good practice.

2.2.3 A review of the updated IAQM guidance, Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2, January 2024) (IAQM, 2024), indicates that no additional mitigation measures are required for "high risk" sites, as the mitigation measures set out within the "Mitigation for all sites" table of the updated IAQM guidance remain consistent with those proposed in the submitted AQA and AQMP.

2.2.4 With regards to operational phase mitigation measures, the November 2023 AQA demonstrated that the proposed development would support measures such as those included in the HDC Action Plan (Horsham District Council , 2026). HDC have agreed the air quality offset contribution through the S106 agreement and therefore no further mitigation measures relating to the operation of the proposed development are required.

2.3 Particulate Matter Considerations

2.3.1 The Environment Act 2021 established a legally binding duty on the government to set at least two new air quality targets, one of which must be in respect of the annual mean level of $PM_{2.5}$ in ambient air (Environment Act, 2021). In response to this, the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 sets the two new legally-binding long-term targets to reduce concentrations of $PM_{2.5}$ (UK Government, 2023). The two new targets are an annual mean concentration of 10 $\mu g/m^3$ or below by 2040 at any monitoring station (the Annual Mean Concentration Target or AMCT) and a reduction in average population exposure by 35% by 2040, compared to a 2018 baseline (the Population Exposure Reduction Target or PERT). The Environmental Improvement Plan 2025 for England sets interim targets that by 2030, an annual average of 10 $\mu g/m^3$ for $PM_{2.5}$ is not exceeded at any monitoring station and population exposure to $PM_{2.5}$ is at least 30% less than in 2018 (Defra, 2025).

2.3.2 Following the publication of the Environment Act $PM_{2.5}$ targets, Defra have produced interim planning guidance to help Applicants demonstrate that they have appropriately considered the $PM_{2.5}$ targets when making planning applications (Defra, 2024).

2.3.3 The guidance states that the new targets move away from a requirement to assess solely whether a scheme is likely to lead to an exceedance of a legal limit and instead ensures that appropriate mitigation measures are implemented from the design stage, streamlining the process for planning and ensuring the minimum amount of pollution is emitted and that exposure is minimised.

2.3.4 The following questions are designed to be used as prompts that the applicant can use to illustrate how their planning application has taken appropriate action to minimise emissions of $PM_{2.5}$ and its precursors as far as reasonably practicable:

1. "How has exposure to $PM_{2.5}$ been considered when selecting the development site?

   Applicants are advised to consider the following in their application:

   - Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these,
   - Site proximity to pollution sources and the impact of these on users of the development,
   - Exposure and emissions during both construction and in-use.

2. What actions and/or mitigations have been considered to reduce $PM_{2.5}$ exposure for development users and nearby receptors (houses, hospitals, schools etc.) and to reduce emissions of $PM_{2.5}$ and its precursors?
   Applicants are advised to explain (with evidence where possible) why each measure was implemented. Or, if no mitigation measures have been implemented, why this was not proposed. Actions can refer to, but are not limited to, the following:

   - Site layout,
   - The development's design,
   - Technology used in the construction or installed for use in the development,
   - Construction and future use of the development."

2.3.5 Finally, the guidance states that planning authorities are encouraged to consider the cumulative impact of development when making decisions on a case-by-case basis.

2.3.6 As presented in Section 4 (Baseline) of the submitted November 2023 AQA, Defra provides background concentration maps to assist local authorities in undertaking their air quality review and assessments. The most recent background maps available at the time of completing the November 2023 AQA are based on the monitoring and meteorological data for 2018 and present projected concentrations for years 2018 to 2030 (DEFRA, n.d.). The predicted background concentration for the year 2025, the assessed earliest year of occupation, within the grid square that the proposed development would be situated in indicated the $PM_{2.5}$ 2025 projected concentration would be 8.10µg/m^3 and therefore below the relevant Air Quality Objectives and the targets. As such, projected air quality is anticipated to be of good quality. Additionally, during the construction stage of the proposed development, numerous measures (discussed in Section 2.2) will be taken to reduce emissions of $PM_{2.5}$ and reduce exposure for nearby residential receptors.

2.3.7 The proposed site plan shows dwellings (sensitive receptors) would be set back from the main road network (High Bar Lane) by approximately 25m. During operation, no emissions will be generated by combustion (e.g. gas boilers) as the proposed development proposes to use heat pumps as part of the energy strategy. The proposed development also includes the provision of public footpaths, bridleways and cycleways which would encourage sustainable travel at the Site. Furthermore, the November 2023 AQA demonstrated that the increase in vehicle movements associated with the operation of the proposed development is not expected to significantly effect air quality (including $PM_{2.5}$ concentrations) at exiting receptors in the surrounding area.

2.3.8 Overall, the proposed development has been designed to minimise $PM_{2.5}$ emissions and exposure. Given the good baseline air quality, proposed Site design, limited operational phase emissions, and the implementation of appropriate mitigation measures, the development is considered to accord with the objectives of Defra's $PM_{2.5}$ Interim Planning Guidance.

2.4 Sussex Air Quality and Emissions Mitigation Guidance

2.4.1 HDC has adopted the Sussex Air Quality and Emissions Mitigation Guidance, this guidance was updated in 2026 and is currently available as interim guidance. The interim Sussex Air Quality and Emissions Mitigation Guidance indicates that the proposed development would require demonstration of good design measures, an air quality assessment and an emissions mitigation assessment. As agreed with HDC, an updated air quality assessment and a detailed emissions mitigation assessment is not considered necessary.

2.4.2 It should be noted at the outset that the location benefits from good air quality so there are no sources of pollution that require any specific, additional good design measures to protect against poor air quality. As mentioned within Section 2.3, however, the proposed development does incorporate a number of good design measures beneficial to air quality. The measures outlined would be beneficial in reducing emissions and exposure to all relevant air pollutants considered within the AQA, not only $PM_{2.5}$. Examples of good design measures embedded within the development proposals include:

- Dwellings (sensitive receptors) would be set back from the main road network (High Bar Lane) by at least 5m;
- Incorporation of green space;
- Provision of new pedestrian routes, bridleways, cycleways and dedicated cycle storage to encourage sustainable travel; and
- Zero emission heating systems proposed (heat pumps).

3. Conclusion

3.1.1 This Technical Note has been prepared in response to comments received from HDC regarding the discharge of Schedule 5 (Air Quality Management Plan) of the Section 106 Agreement associated with planning permission DC/23/2152 (as varied by DC/26/0209).

3.1.2 The HDC response confirmed that an updated AQA is not considered necessary given the scale of the development and the findings of the approved assessment. However, HDC requested confirmation that the Air Quality Management Plan (AQMP) (proposed mitigation measures) has been reviewed against current air quality guidance and that appropriate and proportionate measures to minimise emissions and exposure have been incorporated.

3.1.3 HDC have agreed the air quality offset contribution through the S106 agreement and therefore no further mitigation measures relating to the operation of the proposed development are required.

3.1.4 Following the completion of the November 2023 AQA, IAQM released an update to the Assessment of Dust from Demolition and Construction guidance. A review of the latest IAQM guidance showed that the mitigation measures for the identified level of risk for the Site ("High Risk") remain the same as those outlined within the AQA. Therefore, no additional mitigation measures are required for "high risk" sites.

3.1.5 An assessment of the proposed development in line with Defra $PM_{2.5}$ Targets: Interim Planning Guidance showed exposure of $PM_{2.5}$ has been considered when selecting the Site, and that mitigations have been considered to reduce $PM_{2.5}$ emissions and exposure for existing and future sensitive receptors.

3.1.6 HDC has adopted the Sussex Air Quality and Emissions Mitigation Guidance which released an updated interim guidance in 2026. The interim Sussex Air Quality and Emissions Mitigation Guidance indicates that the proposed development would require demonstration of good design measures, an air quality assessment and an emissions mitigation assessment. The location benefits from good air quality and there are no pollution sources that require specific, additional mitigation. Notwithstanding this, the proposed development has incorporated good design measures beneficial to air quality. Examples of good design measures embedded within the development proposals include proposed distance of dwellings set back from the road network, provision of new pedestrian routes and cycleways and the use of zero emission heat pumps.

3.1.7 Overall, this Technical Note has shown that the findings of the November 2023 AQA remain valid. A review of the proposed development against the latest IAQM construction dust guidance, Interim $PM_{2.5}$ Planning guidance, and Sussex Air Quality guidance indicate that no additional mitigation would be required for the proposed development to be considered acceptable with regards to air quality.

4. References

Defra. (2024). *PM2.5 Targets: Interim Planning Guidance.* Retrieved from https://uk-air.defra.gov.uk/pm25targets/planning

Defra. (2025). *Environmental Improvement Plan (EIP) 2025*. Retrieved from https://www.gov.uk/government/publications/environmental-improvement-plan-2025/environmental-improvement-plan-eip-2025

DEFRA. (n.d.). *Background Mapping data for local authorities - 2018*. Retrieved from UK AIR Air Information Resource: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

Environment Act. (2021). *Environment Act.* Retrieved from https://www.legislation.gov.uk/ukpga/2021/30/enacted/data.pdf

Horsham District Council . (2026). *Air Quality Action Plan.* Retrieved from https://www.horsham.gov.uk/__data/assets/pdf_file/0009/169551/HDJB37a-Appendix-A-Air-Quality-Action-Plan.pdf

IAQM. (2023, October 10). *Guidance on the assessment of dust from demolition and construction*. Retrieved from Institute of Air Quality Management: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-dust-2023-BG-v6-amendments.pdf

IAQM. (2024). *Guidance on the Assessment of Dust from Demolition and Construction 2024 (Version 2.2)*. Retrieved from IAQM Guidance: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf

Sussex-air Quality Partnership. (2026, July). *Interim Air quality and emissions mitigation guidance for Sussex Version 2.0*. Retrieved from https://www.horsham.gov.uk/__data/assets/pdf_file/0011/67691/Sussex-Air-Guidance-v.2.0.pdf

UK Government. (2023). *The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023.* Retrieved from Environmental Protection, England 2023 No. 96: https://www.legislation.gov.uk/uksi/2023/96/made/data.pdf

Air Quality Technical Note

Land To the North of High Bar Lane, Thakeham West Sussex

Appendix A:

Air Quality Assessment (November 2023)

Land at High Bar Lane Thakeham, West Sussex

Air Quality Assessment

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1. Introduction

1.1 Overview

1.1.1 Savills UK Limited (Savills) was retained by High Bar Lane Limited (the 'Applicant') to complete an Air Quality Assessment (AQA) for the application for the residential development of circa 28 new dwellings on land at High Bar Lane in Thakeham (the 'Site').

1.1.2 The AQA has been completed to accompany the Planning Application, to review existing air quality in the area, assess the potential effects of the development upon local air quality and consider appropriate measures to mitigate any effects.

1.1.3 The latest planning guidance from Environmental Protection UK (EPUK) in partnership with the Institute of Air Quality Management (IAQM) (EPUK and IAQM, 2017), the Department for Environment Food and Rural Affairs (DEFRA, 2021), the IAQM Guidance on the assessment of dust from demolition and construction (Version 2.1) (IAQM, 2023) and the Air Quality and Emissions Mitigation Guidance for Sussex (Sussex-air partnership, 2021), were utilised to assess the potential local air quality effects of the proposed development.

1.2 Project Details

1.2.1 The proposed development is located within the village of Thakeham, as presented in Figure 1-1 and is not located in an Air Quality Management Area (AQMA). The Site falls within the administrative boundary of Horsham District Council (HDC) which has two AQMAs (Storrington and Cowfold). The nearest AQMA to the site is located approximately 2.8km south-west of the site.

1.2.2 The Site is located approximately 2.5km to the east of the South Downs National Park, a protected landscape because of its special qualities.

1.2.3 The Site is currently undeveloped land with no existing buildings or vehicular access to High Bar Lane. Footpath 2474 runs along the western boundary of the site and is also bisected by a new bridleway. The proposed development is for a residential development of 28 dwellings and a new vehicular access to the site from High Bar Lane via a new simple priority junction. The Site is also proposed to accommodate pedestrian and cycle permeability via access on footpath 2474 and the new bridleway.

Figure 1-1: Site location



1.2.4 The proposed development will have a number of design features that protect air quality and reduce carbon dioxide emissions, including the use of air source heat pumps (ASHP) in all houses and electric boilers for apartments and maisonettes.

1.2.5 Additionally, as noted in the Transport Statement, single EV charging points with garages is proposed to be provided for all dwelling houses, and charging points would be provided for parking bays and curtilage parking. Overall, the provision of EV charge points for the proposed developments would be in accordance with the requirements set out within West Sussex's County Council's Guidance on Parking at New Developments.

1.2.6 Provision of secure cycle parking would be accommodated within individual garages whereas dwellings without garages would be provided with individual bicycle enclosures within their private amenity space. A dedicated secure cycle store is proposed for the proposed flatted development, with a minimum of 6 secure cycle parking spaces provided as per the Council's minimum cycle parking standard.

1.2.7 There are opportunities for active transport by pedestrians and cyclists through the use of the new bridleway which would be formally adopted as a public right of way and upgrade of Footpath 2474 to bridleway status (proposed as part of the Abingworth Nursery Development). These bridleways would provide a network which runs through the Site.

1.2.8 As part of the air quality assessment, pollutants from road traffic emissions, NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) were assessed and are further discussed in Appendix A.

2. Legislation and Policy

2.1.1 This section summarises all legislation and policy guidelines relevant to the proposed development.

2.1 European Union

Council Directive on ambient air quality and cleaner air for Europe (2008/50/EC) (European Union, 2008)

2.1.1 The United Kingdom (UK), is required to report air quality data under European Directives. The current air quality directive is the Council Directive on ambient air quality and cleaner air for Europe (2008/50/EC) (European Union, 2008), which came into force in June 2008 and is also known as the Air Quality Directive. This Directive consolidates the first three Daughter Directives and maintains air quality objectives set out for nitrogen dioxide (NO_2) and oxides of Nitrogen (NO_x), lead (Pb), sulphur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), benzene (C_6H_6), and ozone (O_3). The Air Quality Directive was transposed into the Regulations in England, Scotland, Wales and Northern Ireland in June 2010. The fourth Daughter Directive, which sets out air quality objectives for polycyclic aromatic hydrocarbons and heavy metals (i.e., arsenic, cadmium, nickel and mercury), remains in force based on the requirements set out in the first EU Ambient Air Quality Framework Directive (1996/62/EC) (European Union, 1996).

The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (DEFRA, 2019)

2.1.2 Following Brexit, Defra published The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (DEFRA, 2019), which retained law derived from the EU Air Quality Directive and transposed it into domestic law; ensuring the legislation was operable after EU Exit.

2.2 National Level

Local Air Quality Management Technical Guidance (TG22) (DEFRA, 2022)

2.2.1 Under Part IV of the 1995 Environment Act (UK Public General Acts, 1995), the UK government was required to publish a National Air Quality Strategy (NAQS) to establish a Local Air Quality Management (LAQMs) system for the designation of Air Quality Management Areas (AQMAs). The technical guidance by DEFRA highlights that LAQM is a statutory process by which local authorities address air quality and where local authorities identify areas of non-compliance with the national air quality objectives and then declare AQMAs, where national air quality objectives are not likely to be achieved by the relevant deadlines. For areas designated as AQMAs, an Air Quality Action Plan (AQAP) is produced by the local authority that sets out actions designed to help achieve compliance with the objectives.

The National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023)

2.2.2 The National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023) sets out the planning policies for England whereby conserving and enhancing the natural environment is a central theme.

2.2.3 Paragraph 174 section e of the NPPF states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected

by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

2.2.4 Paragraph 186 of the NPPF states that:

"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."

The National Planning Practice Guidance (NPPG) (Ministry of Housing, Communities & Local Government, 2019)

2.2.5 The National Planning Practice Guidance (NPPG) (Ministry of Housing, Communities & Local Government, 2019) supports the NPPF and guides a range of topic areas, including air quality. The NPPG states (Ministry of Housing, Communities & Local Government, 2019) states:

"Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity."

2.2.6 Additionally, it is recognised in the NPPG that the UK has legally binding limits for ambient air concentrations of major air pollutants (e.g., NO_2, PM_{10} and $PM_{2.5}$). An annual national assessment of air quality, through modelling and monitoring, is conducted by DEFRA to determine compliance with relevant European Directive Limit Values. The relevant European Directive Limit Values are summarized in Table 2-1 and the UK National Air Quality Objectives are summarized in Table 2-2.

Table 2-1: European Directive Limit Values (DEFRA, 2022)

Pollutant	Limit Value (µg/m^3)	Averaging Period	Objective Limitation
Nitrogen Dioxide (NO_2)	200	1-hour mean	Not to be exceeded more than 18 times a year
	40	annual mean	-
Particulate Matter (PM_{10})	50	24-hour mean	Not to be exceeded more than 35 times a year
	40	annual mean	-
Particulate Matter ($PM_{2.5}$)	Stage 1 limit – 25 (by 2015)	annual mean	-
	Stage 2 limit – 20 (by 2020)		-
	Target a 20% reduction in concentrations at urban background	annual mean	-

Table 2-2: National Air Quality Objectives (DEFRA, 2021; DEFRA, n.d.).

Pollutant	Objective (µg/m^3)	Averaging Period	Objective Limitation	Applicable to:
Nitrogen Dioxide (NO_2)	200	1-hour mean	Not to be exceeded more than 18 times a year	UK
	40	annual mean	-	
Particulate Matter (PM_{10})	50	24-hour mean	Not to be exceeded more than 35 times a year	
	40	annual mean	-	
Particulate Matter ($PM_{2.5}$)	20	annual mean	-	UK (except Scotland)
	(target a 15% reduction in concentrations at urban background)		-	UK urban areas

While the air quality Limit Values and Objectives are numerically the same, they apply in different locations and are assessed using different methods. This report provides an assessment based on the air quality objectives. Table 2-3 presents examples related to the averaging period of the specific objectives to identify where objectives should and should not apply, and are relevant only to members of the public (DEFRA, 2021). It should be noted that the World Health Organisation (WHO) updated its air quality guidelines in 2021 (World Health Organisation, 2021). The UK is yet to determine whether to adopt these guidelines in the National Air Quality Objectives and so

2.2.7 Table 2-2 remains the most up-to-date AQO, hence are the guidelines used throughout this report.

Table 2-3: Applying relevant National Air Quality Objectives (DEFRA, 2021)

Averaging Period	Objectives Should Apply At:	Objectives Should Generally Not Apply At:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. 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	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties[a].	Kerbside sites (as opposed to locations at the building façade), or any other location where public 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.

[a] Such locations should represent parts of the garden where relevant public exposure to pollutants is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.

The Environment Act 2021 (GOV.UK, 2021)

2.2.8 The Environment Act 2021 established a legally binding duty on the government which brings forward at least two new air quality targets in secondary legislation and this duty sits within the environmental targets framework outlined in the Environment Act (Part 1). Both of the targets under the Act concern $PM_{2.5}$, where one states that for $PM_{2.5}$ "Annual Mean Concentration Target ('concentration target') - a maximum concentration of 10µg/m^3 to be met across England by 2040" (DEFRA, 2022). It is expected that pollution levels associated with traffic will decrease over time with the expected increased uptake of electric vehicles and other alternative fuel vehicles in line with national and local policy for transport.

2.2.9 NO_2 and PM_{10} are not mentioned within the two new air quality targets currently in consultation; however, the Committee on the Medical Effects of Air Pollutants (COMEAP) anticipates that most measures implemented to achieve reductions in $PM_{2.5}$ would also be likely to reduce concentrations of other pollutants (UK Health Security Agency, 2022).

2.3 Local Policy

2.3.1 The Horsham District Planning Framework (HDPF) (2015) is the current Local Plan for HDC. The HDPF (2015) focusses on 6 priority themes, including the environment. One of the key issues highlighted in the HDPF was the effect on air quality due to increased traffic in the District and the AQMAs associated with nitrogen dioxide in Storrington and Cowfold. Overall, the HDPF (2015) states: *"The impact of increased traffic on air quality in the rest of the district will need to be considered and mechanisms to improve air quality should be put into place."*

2.3.2 One of the key strategic policies in the HDPF (2015) specifically highlighting air quality is Policy 24 (Environmental Protection):

"*The high quality of the district's environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to and the emission of pollutants including noise, odour, air and light pollution and ensure that they:*

1. *Address land contamination by promoting the appropriate re-use of sites and requiring the delivery of appropriate remediation;*
2. *Are appropriate to their location, taking account of ground conditions and land instability;*
3. *Maintain or improve the environmental quality of any watercourses, groundwater and drinking water supplies, and prevents contaminated run-off to surface water sewers;*
4. *Minimise the air pollution and greenhouse gas emissions in order to protect human health and the environment;*
5. *Contribute to the implementation of local Air Quality Action Plans and do not conflict with its objectives;*
6. *Maintain or reduce the number of people exposed to poor air quality including odour. Consideration should be given to development that will result in new public exposure, particularly where vulnerable people (e.g. the elderly, care homes or schools) would be exposed to the areas of poor air quality; and*
7. *Ensure that the cumulative impact of all relevant committed developments is appropriately assessed.*

2.3.3 The Air Quality and Emissions Guidance for Sussex (Sussex-air partnership, 2021) was adopted by HDC in 2021. This guidance aims to provide (Sussex-air partnership, 2021):

- clarity as to how authorities intend interpreting relevant Local Plan policies;
- provides advice for developers and their consultants on how to assess and mitigate the impact that new developments may have on local air quality and

- details a consistent approach by developers and local planning authorities (LPAs) to
  - address impacts on local air quality;
  - to ensure optimum scheme design to reduce emissions and/or exposure and
  - avoid unnecessary delays in the planning process.

3. Methodology

3.1.1 The development proposed is for circa 28 residential dwellings (i.e., the number of dwellings is 10 or above and will have more than 10 parking spaces) and the site extends to approximately 1.8 hectares (i.e., development carried out on land of 1 hectare or more) and so the development has been treated as though it is a 'Major Development' (EPUK and IAQM, 2017).

3.1.2 This section outlines the EHO comments received pertaining to air quality, and the methodology used in completing the air quality assessment for the construction and operational phases of the proposed project.

3.1 Communication with the Environmental Health Officer

3.1.1 As part of this AQA, consultation has taken place with the Environmental Health Officer (EHO) at HDC via email correspondence in May 2023 and October 2023. Email correspondence dated 22nd May 2023 from the Air Quality Project Officer at HDC stated that DEFRA TG 2022 guidance and the latest HDC ASR should be referred to. It was also advised that Part S of the Building Regulations 2021 for electric charging points should be followed as a minimum, and the impacts of the development upon the nearest AQMA should be assessed.

3.1.2 Upon amendments to the scope of the development, further email correspondence was held with the Air Quality Project Officer at HDC, dated 30th October 2023. This clarified that an AQA and Emissions Mitigation Assessment is necessary, and that any measures put forward for the air quality mitigation plan should avoid duplication of measures that would normally be required through other regimes.

3.1.3 Overall, the approach proposed by the Air Quality Team was agreed to be sensible and appropriate. The EHO's comments are summarised below, which have been taken into consideration as part of the assessment:

- note that current AQ standard are being reviewed nationally
- refer to DEFRA TG 2022
- refer to the latest Horsham Annual Status Report
- follow Part S of the Building Regulations 2021 for electric charging points as minimum
- the assessment should be transparent and thus, where reasonable, all input data used, assumptions made, and the methods applied should be detailed in the report (or appendices).
- the Mitigation measures for the proposed development should be in line with the Sussex Air (2021) Air Quality and Emissions Mitigation Guidance for Sussex.
- recommended that the emission mitigation statement contain itemised costing for each proposed mitigation option and total value of all proposed emissions' mitigation. This should be equal to the value from Emissions calculation and total calculated value of emissions' health damage cost.
- Sussex Air quality guidance aims to avoid the duplication of measures that would normally be required through other regimes.
- we would highly recommend improvements to existing cycling paths, and including cycle paths that meet up with current paths in the development design.
- we would also support measures such as contributions to measures included in the Action Plan, Storrington AQMA scheme proposals available at Storrington AQMA page; support towards HDC's public building energy performance retrofit programme; support towards HDC's vehicle replacement programme; promotion of public transport to residents through financial incentives.

3.2 Construction Phase

3.2.1 The assessment has been carried out assuming that the earliest possible year of construction commencement is 2024 and earliest possible year of occupation is 2025.

3.2.2 For this assessment, the IAQM's 2023 Construction Dust Guidance (IAQM, 2023) was utilised to assess the potential impacts of dust during the construction phase. The IAQM guidance provides an evaluation matrix to determine the potential risk of dust generation and the associated level of mitigation required.

3.2.3 As a component of the dust assessment, receptor sensitivities were identified and impacts due to annoyance from dust soiling and the risk of health effects from an increase in exposure to PM_{10} were assessed.

3.2.4 Additionally, the EPUK and IAQM (2017) planning guidance was used to assess construction traffic generation. The EPUK and IAQM set out seven indicative criteria for requiring an AQA and as such, were considered in determining the need for an AQA, as shown in Table 3-1.

Table 3-1: Indicative criteria for requiring an AQA (Table 6.2 of EPUK and IAQM Guidance (2017))

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment [a]
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans)	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/s is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

[a] As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm^3. Users of the guidance should quantify the NO_x mass emission rate from the proposed plant, based on manufacturers' specifications and operational conditions.

3.3 Operational Phase

3.3.1 The assessment relies on the planning guidance by EPUK and IAQM (2017). The impact of existing sources in the local area and the impacts of the proposed development on the local area were considered in the assessment process. As part of the assessment, the following factors are to be taken into account as per the guidance (EPUK and IAQM, 2017):

- the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;
- the presence and location of AQMA as an indicator of local hotspots where the air quality objectives may be exceeded;
- the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO_2), that would cause unacceptably high exposure for users of the new development; and,
- the presence of a source of odour and/or dust that may affect amenity for future occupants of the development.

3.3.2 The EPUK and IAQM set out 7 indicative criteria for requiring an AQA and as such, these were considered in determining the need for an AQA, as shown in Table 3-1.

3.3.3 The indicative criteria presented in Table 3-1 were utilised for the assessment of the operational phase.

3.4 Assumptions

3.4.1 The assessment assumes the following:

- the construction year is 2024 and first occupation year is 2025;
- the construction phase assesses impacts for the worst-case scenario;
- all mitigation measures proposed in Section 6 will be implemented.

4. Baseline Conditions

4.1.1 The following section sets out the baseline conditions related to air quality for the proposed development. For this assessment, baseline data was obtained from the most recent HDC's Air Quality Annual Status Report (ASR) (Horsham District Council, 2023), the monitoring sites presented by HDC (Horsham District, 2023), and the background mapping data for local authorities from DEFRA (DEFRA, n.d.).

4.1 Existing Baseline Conditions

4.1.1 As previously mentioned, the proposed development is not within an AQMA. The closest AQMA to the Site is the Storrington AQMA and is located approximately 2.8km south-west of the site.

Figure 4-1: Location of Site, existing monitoring sites in HDC and associated AQMAs.



4.1.2 Based on the 2023 ASR, HDC has three automatic (continuous) monitoring stations for NO_x and PM_{10} and 42 non-automatic (passive) monitoring sites of NO_2 during 2022 with 49 diffusion tubes. Of the 42 non-automatic monitoring sites, 16 were located in Storrington, of which 8 were located within the AQMA (i.e., Storrington 1,3,4,5,11n,12n,13n, and 19n).

4.1.3 The ASR noted that all sites registered a decrease in measured levels of NO_2 in 2020, which were attributed to reduced traffic volumes due to the pandemic, with an increase in NO_2 concentrations in 2021 (averaging 5% relative to 2020)

which was attributed to the easing of national and local COVID pandemic restrictions (Horsham District Council, 2023). Relative to pre-pandemic 2019 NO_2 concentrations, there was a decrease of 11% as the traffic volumes remain below the 2019 levels (Horsham District Council, 2023). In 2022, most sites observed a decrease in NO_2 concentrations averaging -19% relative to pre-pandemic levels in 2019.

4.1.4 The annual mean recorded at the continuous monitoring site HO4 Storrington AURN for 2021 was 17.6µg/m^3, a 12% decrease from 20.1µg/m^3 in 2020 (Horsham District Council, 2023). The increase can be attributed to the ease on COVID restrictions. However, this is still below the national objective of 40µg/m^3.

4.1.5 Figure 4-1 illustrates the locations of the non-automatic monitoring site locations in Storrington in relation to the proposed development (Horsham District, 2023). The nearest monitoring site to the Site is Storrington 15N, approximately 2.8km west of the site. Table 4-1 presents the relevant monitored annual mean concentrations recorded at the Storrington non-automatic monitoring sites between 2017 and 2022. The roadside Storrington 19N monitoring site, approximately 2,850m from the Site, was the only relevant non-automatic monitoring site in Storrington with measured concentrations within 10% of the annual mean objective (i.e. 36µg/m³ or more) in 2022.

Table 4-1: Annual mean NO_2 monitoring results for relevant non-automatic monitoring sites in Storrington

Site name	Type	Located in the AQMA?	Approximate Distance from Site (m)	NO_2 Annual Mean Concentration (µg/m^3)					
				2017	2018	2019	2020	2021	2022
Storrington 14N	Roadside	N	2,830	**43.0**	38.5	33.4	27.8	25.8	26.3
Storrington 8,9,10 AURN (triplicate)	Roadside	N	2,860	25.5	26.6	22.9	20.5	21.7	21.7
Storrington 1	Roadside	Y	2,850	**40.7**	**44.7**	38.9	31.6	34.3	32.9
Storrington 19N	Roadside	Y	2,850	**56.4**	**50.6**	**47.7**	38.4	39.6	38.1
Storrington 3	Roadside	Y	2,830	31.6	32.9	28.3	23.3	24.8	23.7
Storrington 15N	Roadside	N	2,550	20.3	18.9	16.9	14.9	15.4	14.6
Storrington 16N	Roadside	N	2,770	23.5	24.0	21.6	18.9	19.2	18.4
Storrington 4	Roadside	Y	2,900	37.5	35.8	29.7	25.5	25.9	26.7
Storrington 5	Roadside	Y	2,940	27.4	26.4	23.3	18.7	19.9	19.0
Storrington 17N	Urban background	N	3,090	12.9	13.3	11.2	9.8	10.0	9.6
Storrington 13N	Roadside	Y	2,960	31.1	29.9	25.6	21.4	23.1	23.0
Storrington 12N	Roadside	Y	2,980	29.0	28.6	26.0	20.0	23.0	22.4
Storrington 11N	Roadside	Y	2,990	37.5	37.8	29.8	25.0	26.5	25.9
Storrington 6	Roadside	N	3,000	24.3	22.3	18.8	14.8	17.1	17.4
Storrington 7	Roadside	N	3,090	21.5	20.9	18.4	15.6	17.6	17.7
Storrington 18N	Roadside	N	3,190	20.4	19.1	16.0	13.4	18.1	15.4
Pulborough 2	Roadside	N	5,250	21.1	20.7	17.9	15.7	16.7	16.1

Notes:
Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.
Diffusion tube data has been bias adjusted.
Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.
In **bold**, exceedance of the NO_2 annual mean objective of 40µg/m^3.

4.1.6 Based on the data presented in Table 4-1, the NO_2 annual mean concentrations are all below the annual mean objective of 40µg/m^3 at the relevant monitoring sites in Storrington in 2021. However, in 2021, one of the 16 monitoring sites (i.e., Storrington 19N) has concentrations that are within 10% of the NO_2 annual mean objective of 40µg/m^3 which demonstrates the continued requirement for the Storrington AQMA. The overall long-term sites show a continuing downward trend in NO_2 annual mean concentrations over the last five years.

4.1.7 DEFRA provides background concentration maps to assist local authorities in undertaking their air quality review and assessments. The most recent 2018 reference year background maps are based on the monitoring and meteorological data for 2018 and present projected concentrations for years 2018 to 2030 (DEFRA, n.d.). DEFRA notes that the projections for the 2018-based background maps are based on assumptions before the pandemic; they do not reflect short or long term impacts on emissions in 2020 due to the pandemic.

4.1.8 Based on the 2018-based background maps for the year 2024, a separate 1x1km grid file of concentrations for HDC was downloaded for NO_2, PM_{10}, and $PM_{2.5}$. Table 4-2 presents the predicted background concentration for the year 2025, the earliest year of occupation, within the grid square that the proposed development would be situated in.

Table 4-2: Local authority wide DEFRA projected background concentration

Pollutant	2025 Projected Concentration (µg/m^3)
NO_2	6.77
PM_{10}	12.72
$PM_{2.5}$	8.10

Data presented within the table is derived from the following ordinance survey grid squares: 510500, 116500

4.2 Local Sensitive Receptors

4.2.1 The Site is located in Thakeham running either side of Storrington road around the existing properties in the village. The closest AQMA is located approximately 2.8km south-west of the Site, as previously discussed in Section 1.2. The surrounding area has high sensitivity residential receptors.

4.2.2 The edge of the South Downs National Park, a protected landscape because of its special qualities, is 2km to the west and 2km to the south of the proposed Site and is the closest environmental designated area. Preliminary Ecological Appraisal and Biodiversity Net Gain Reports have been submitted in support of the Planning Application. However, the ecological effects are not considered further as the Site and South Downs are separated by a considerable distance from the boundary of the Site.

5. Potential Impact

5.1 Construction Phase

5.1.1 As per the IQAM Dust Guidance (2014), there are four types of activities on construction sites:

- demolition;
- earthworks;
- construction; and,
- trackout.

5.1.2 Demolition is not anticipated at the Site as it is currently undeveloped land.

5.1.3 Potential dust impacts from the proposed development can arise from (IAQM, 2014):

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to PM_{10}; and,
- harm to an ecological receptor.

5.1.4 As indicated in Section 4.2, ecological receptors were not assessed as the Site and the nearest designated area (South Downs) are separated by a 2 km.

5.1.5 To assess the risk of dust impacts for the relevant activities, the potential impact on dust soiling and human health were treated as being 'high risk' in order to obtain mitigation measures for the worst-case scenario and apply those measures which constitute good or best practice. As such, the general measures applicable to a high risk site are applied and discussed in Appendix B, as outlined by IAQM (2014).

Table 5-1: Assigned risk for construction effects

Potential Impact	Risk *			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	High Risk	High Risk	High Risk
Human Health	N/A	High Risk	High Risk	High Risk

* Potential impact on dust soiling and human health were described as being 'high risk' in order to provide mitigation measures for the worst-case scenario.
N/A Not Applicable

5.1.6 The construction phase is anticipated to run for a year and no demolition would be required. Within the construction phase, construction-related vehicles may potentially present an additional source of air pollutants within the proposed development site. However, construction traffic are anticipated to be well below 500 LDV and 100 HDV on any local road for the proposed development and any impacts from construction traffic should be minimised and addressed through the mitigation measured proposed in Appendix B, as per the Best Practice Guidance outlined by IAQM (2023). As such, the indicative EPUK & IAQM guidance thresholds are not exceeded and a further AQA is not required.

5.2 Operational Phase

5.2.1 As identified in Section 4.1, the baseline indicates that the NO_2 monitoring data for the most recent year (i.e., 2021) is below the appropriate AQO (i.e,.40 µg/m^3) derived to be protective of human health, with the recorded concentrations

below 36µg/m^3 (within 10% of the NO_2 annual mean objective of 40µg/m^3), with the exception of monitoring site Storrington 19N. In 2021, the highest recorded concentration was 39.6 µg/m^3 at Storrington 19N which has consistently shown a decrease in NO_2 annual mean concentration between 2017, when an annual mean of 56.4 µg/m^3 was recorded, and 2020 (38.4 µg/m^3).

5.2.2 Based on the Transport Statement, it is expected that there will be an additional 138 vehicle trips per day based on the number of new dwellings. As such, in accordance with the EPUK and IAQM Planning Guidance (2017), the proposed development will not cause a significant change in vehicle traffic flows (the indicative criteria relevant to the proposed development is a change of more than 500 annual average daily traffic (AADT) outside an AQMA).

5.2.3 The EPUK and IAQM set out 7 indicative criteria for requiring an AQA. Of the 7 indicative criteria, one is the proposed development having one or more substantial combustion processes. The proposed development will use ASHPs and electric boilers; therefore, no emissions will be generated by gas boilers and the NO_x emission rate of 5mg/sec limit presented in Table 3-1 is not relevant.

5.2.4 None of the indicative criteria proposed in the EPUK and IAQM Planning Guidance (2017) are triggered, as such the development may be considered to have insignificant effects. The development effectively responds to the relevant guidance on mitigation with the embedded measures proposed, including providing electric vehicle charging infrastructure, ASHPs, access to cycling storage spaces as well as footpaths and bridleways to allow for active travel.

6. Proposed Mitigation Measures

6.1.1 The Air Quality and Emissions Mitigation Guidance for Sussex (Sussex-air partnership, 2021) provides context on conducting quantitative emissions mitigation assessments that allow for a consistent approach to mitigation. The guidance follows a three-step process where the first step screens proposed developments based on their size, location, and impact. The developments which are retained after the first screening step are required to complete an emissions mitigation assessment to avoid, minimise and off-set the impact on local air quality (Sussex-air partnership, 2021). The emissions mitigation assessment is a quantitative assessment that assigns a monetary value to the additional emissions generated by traffic from the proposed development (based on outlined assumptions) which gives an indication of the value of mitigation that should be applied.

6.1.2 Overall, the proposed development will incorporate Principles of Good Practise and Good Design to reduce emissions and exposure to sensitive receptors. The proposed project will include EV charging for all houses with garages in accordance with Part S of the Building Regulations 2021 plus charging bollards for communal apartment parking areas, as per the Approved Document S of the Building Regulations (in force as of June 2022), and support for active modes of transport (cycle storage, bridleways and footpaths). Additionally, the development will include ASHPs and electric boilers in place of gas boilers. The following Section presents the Emissions Mitigation Statement.

6.1 Emissions Mitigation Statement

Emission Calculations

6.1.1 The Emissions Factors Toolkit (EFT) published by DEFRA and the Devolved Administrations (2021) has been used to estimate the NO_x and $PM_{2.5}$ emissions from the proposed development based upon current and expected AADT flows from the site and along Storrington Road.

6.1.2 There will be an additional 138 vehicle trips per day associated with the proposed development. These values, as stated in the Transport Statement, are presented in Table 6-1.

Table 6-1: Expected AADT post-future development of the Site

	Arrivals	Departures	Total
Proposed daily trips (28 dwellings)	69	69	138
Proposed trips AM (08:00-09:00) (28 dwellings)	4	12	16
Proposed trips PM (17:00-18:00) (28 dwellings)	11	7	18

6.1.3 When using the EFT the following assumptions were made:

- trip length used the National Travel Survey of the UK average of 10km;
- an average speed of 50kph was applied; and
- the IGCB damage costs applied were the IGCB Air Quality Damage Costs per tonne.

Table 6-2: Change in emissions for NO_x and $PM_{2.5}$ for 5 years of operation

Emissions	2025	2026	2027	2028	2029
NO_x (tonnes/year)	0.08987	0.08070	0.07211	0.06449	0.05797
$PM_{2.5}$ (tonnes/year)	0.00673	0.00668	0.00664	0.00661	0.00659

Note: Year 2025 emissions uses total existing development vehicles value, years' post-2025 use the total future proposed development AADT values, as shown in Table 6-1 above.

6.1.4 From 2025 onwards there is a predicted steady decline in emissions, based upon the prediction which EFT makes of an increased use of e-vehicles and cleaner fuels.

Damage Cost Appraisal

6.1.5 The damage cost appraisal kit, published by DEFRA, has been used here to determine the estimated monetary value of health damage by NO_x and $PM_{2.5}$ from additional traffic from the proposed new development.

6.1.6 Values from Table 6-2 were used for this calculation.

6.1.7 This calculator uses the price base year of 2023 and assumes a discount rate of 3.5% per year and 2% health uplift factor. The road type is classified as "Road Transport Rural".

Table 6-3: Output from Damage Cost Appraisal Toolkit using values from the calculated emissions in Table 6-2

	2025	2026	2027	2028	2029
Central Value NOx (£)	458	437	357	314	278
Central Value PM2.5 (£)	223	218	213	209	206

Total Cost (Central Present Value) NO_x = £1,844
Total Cost (Central Present Value) $PM_{2.5}$ = £1,069
Overall Cost= £2,913

6.1.8 Table 6-3 highlights the overall damage cost from emissions associated with the additional traffic arising from the development. This value (£2,913) should be used as the minimum sum of money which must be spent on practical mitigation measures for the project.

6.1.9 Table 6-4 presents the following proposed mitigation option and its total value. As discussed previously in this Section, the proposed development will incorporate Principles of Good Practice and Good Design to reduce emissions and exposure to sensitive receptors; it will include electric vehicle charging points are to be provided to all houses with garages and charging bollards will be provide to communal apartment parking areas, as per the Approved Document S of the Building Regulations (in force as of June 2022), support active modes of transport through the provision of cycle storage, bridleways and footpaths and will include air source heat pumps and electric boilers. As such, as per consultation with the EHO, the proposed development mitigation option would be to support improvements to existing foot or cycle ways, including providing routes which connect to the existing network. Alternative mitigation measures include contributions to measures included in the Storrington AQMA Action Plan (Horsham District Council, 2012) including support towards HDCs public building energy performance retrofit programme, support towards HDCs vehicle replacement programme, and the promotion of public transport to residents through financial incentives.

Table 6-4 Proposed mitigation option and its total value

Mitigation Type	Mitigation Cost (£)
Support measures such as contributions to measures included in the Action Plan, Storrington AQMA scheme proposals available at Storrington AQMA page *	£2,913
Total Value	£ 2,913

* The Applicant would consider contributions to improvements to existing foot or cycle ways, including providing routes which connect to existing network should the LPA prefer

6.1.10 Additionally, the relevant general mitigation measures for construction impacts appropriate for the 'High Risk' site, as proposed by the IAQM Dust guidance (2023), are applied for the proposed development and outlined in Appendix B. No additional mitigation is considered to be necessary.

7. Conclusion

7.1.1 The proposed development would not be located within or in proximity to an AQMA and as such would not compromise any measures within an AQAP.

7.1.2 The concentration of NO_2 for the most recent monitoring year is below the AQO of 40µg/m^3 at the monitoring sites near the proposed Site. Monitoring site Storrington 19N, located approximately 2.8km from the Site, was noted to have the highest recorded NO_2 concentration but has shown a decreasing trend.

7.1.3 To address the risk of dust impacts for construction related activities (i.e., earthworks, construction and trackout), relevant mitigation measures for construction impacts appropriate for 'High Risk' effects, as proposed by the IAQM Dust guidance (2023), will be applied.

7.1.4 Based on the Transport Statement, the proposed development will not cause a significant change in vehicle traffic flows during both the construction and operational phase. Additionally, ASHP and electric boilers are proposed for the development. Based on the indicative screening criteria presented by EPUK and IAQM Planning Guidance (2017), the impacts for the operational phase are considered to have insignificant effects as none of the indicative criteria are triggered.

7.1.5 The proposed development will incorporate Principles of Good Practise and Good Design to reduce emissions and exposure to receptors. The proposals have been designed to actively seek to take into account measures by which the development can help to address the issues associated with climate change. The proposed project will include electric charging points for all dwellings with a garage and provide communal charging bollards for apartment parking areas. There are cycle storage spaces for dwellings without garages. Additionally, the development will include a combination of ASHP and electric boilers which will limit carbon dioxide and other harmful emissions.

7.1.6 Air quality at the site is considered to be very good having regard to all of the monitoring data and exposure to poor air quality for the residents is considered very unlikely.

8. Works Cited

DEFRA. (2019). *Exiting the European Union. Environmental Protection. The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2018.* https://www.legislation.gov.uk/uksi/2019/74/made/data.pdf. Retrieved from https://assets.publishing.service.gov.uk/media/5bf6ddf740f0b64df1661e50/The_Air_Quality__Amendment_of_Domestic_Regulations___EU_Exit__Regulations_2018_-_SI.pdf

DEFRA. (2021, April). *Local Air Quality Management Technical Guidance (TG16)*. Retrieved from Department for Environment Food And Rural Affairs: https://laqm.defra.gov.uk/documents/LAQM-TG16-April-21-v1.pdf

DEFRA. (2021, April). *Local Air Quality Management Technical Guidance (TG16)*. Retrieved from Department for Environment Food And Rural Affairs: https://laqm.defra.gov.uk/documents/LAQM-TG16-April-21-v1.pdf

DEFRA. (2022). *Air Quality Objectives Update.* Retrieved October 14th, 2022, from https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

DEFRA. (2022). *Air Quality Targets in the Environment Act*. Retrieved March 22, 2023, from UK AIR: https://uk-air.defra.gov.uk/library/air-quality-targets

DEFRA. (2022). *Local Air Quality Management Technical Guidance (TG22).*

DEFRA. (n.d.). *Air Quality Management Areas (AQMAs)*. Retrieved from UK AIR Air Information Resource: https://uk-air.defra.gov.uk/aqma/

DEFRA and the Devolved Administrations. (2021, November). *Emissions Factors Toolkit*. Retrieved from https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/

DEFRA. (n.d.). *Background Mapping data for local authorities - 2018*. Retrieved from UK AIR Air Information Resource: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

Department for Levelling Up, Housing and Communities. (2023, September 5). *National Planning Policy Framework.* Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1182995/NPPF_Sept_23.pdf

EPUK and IAQM. (2017, January). *Air Pollution and Planning: Land-Use Planning and Development Control: Planning for Air Quality – January 2017*. Retrieved from Environmental Protection UK: https://www.environmental-protection.org.uk/policy-areas/air-quality/air-pollution-and-planning

European Union. (1996, September). *Ambient Air Quality Assessment and Management*. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31996L0062

European Union. (2008, May). *Ambient Air Quality and Cleaner Air for Europe*. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1486474738782&uri=CELEX:02008L0050-20150918

GOV.UK. (2021). *Environment Act 2021*. Retrieved from Legislation.gov.uk: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted

Horsham District. (2023). *Air quality monitoring in Horsham District*. Retrieved from https://www.google.com/maps/d/viewer?mid=1ZTfcW1aEM1TfDm14Ybakg9VkwAiAA6R2&ll=50.91634140021935%2C-0.44758968430125945&z=17

Horsham District Council. (2012). *Storrington Air Quality Action Plan.* Horsham District Council. Retrieved from https://www.horsham.gov.uk/__data/assets/pdf_file/0003/58854/Storrington-Air-Quality-Plan-2012.pdf

Horsham District Council. (2015). Retrieved from Horsham District Planning Framework : https://www.horsham.gov.uk/__data/assets/pdf_file/0016/60190/Horsham-District-Planning-Framework-November-2015.pdf

Horsham District Council. (2023, June). *2023 Air Quality Annual Status Report*. Retrieved from https://www.horsham.gov.uk/__data/assets/pdf_file/0019/130384/ASR_Horsham_2023_v1.0_4.pdf

IAQM. (2014). *Guidance on the Assessment of Dust from Demolition and Construction 2014* . Retrieved from https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf

IAQM. (2023, October 10). *Guidance on the assessment of dust from demolition and construction*. Retrieved from Institute of Air Quality Management: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-dust-2023-BG-v6-amendments.pdf

Ministry of Housing, Communities & Local Government. (2019, November 1). *National Policy Practice Guidance: Healthy and safe communities*. Retrieved from Ministry of Housing, Communities & Local Government: https://www.gov.uk/guidance/air-quality--3

Sussex-air partnership. (2021, April). *Air quality and emissions mitigation guidance for Sussex*. Retrieved from https://www.adur-worthing.gov.uk/media/Media,165958,smxx.pdf

UK Public General Acts. (1995). *Environment Act 1995*. Retrieved from https://www.legislation.gov.uk/ukpga/1995/25/part/IV

World Health Organisation. (2021). *What are the WHO Air quality guidelines*. Retrieved from World Health Organisation: https://www.who.int/news-room/feature-stories/detail/what-are-the-who-air-quality-guidelines

Air Quality Assessment

Land at High Bar Lane
Thakeham

Appendix A: Key Pollutants

1. Nitrogen Dioxide (NO_2)

1.1.1. Nitrogen Dioxide (NO_2) is a gas that falls under a larger group of reactive gases referred to as nitrogen oxides, including nitric oxide (NO) (USEPA , n.d.). Combustion processes are the main source of anthropogenic emissions of NO_2. NO_2 forms from emissions from vehicles, off-road equipment and power plants (USEPA , n.d.)

1.1.2. The health impacts of short-term exposure to NO_2 are irritation to the respiratory system, and exacerbating symptoms of pre-existing lung and heart diseases (DEFRA, n.d.; DEFRA, 2021).

1.1.3. In the UK, NO_2 is considered a major air pollutant and as such, there is a legally binding limit for annual mean ambient air concentrations of NO_2 at 40 $\mu g/m^3$.

1.1.4. It should be noted that the World Health Organisation (WHO) updated their air quality guidelines in 2021. The UK are yet to adopt these guidelines in their National Air Quality Objectives and so the limits used here remain the most up-to-date hence are the guidelines used throughout the report.

2. Particulate Matter

2.1.1. Particulate matter consists of a variety of particles and compounds in the air and often particulate matter is discussed based on its size. Particles with a diameter of 10 microns or less are referred to as PM_{10}(WHO, n.d.). Particles with a diameter of microns or less are referred to as $PM_{2.5}$ and are more concerning as they can be inhaled and carried deeper into the lungs.

2.1.2. The health impacts of exposure to fine particles include inflammation and irritation to the respiratory system, and exacerbating symptoms of pre-existing lung diseases (Defra, n.d.; Defra, 2021). Although no threshold below which no damage to health is observed for particulate matter, there is a relationship between high concentrations of $PM_{10}$and $PM_{2.5}$ and increased mortality or morbidity (WHO, n.d.).

2.1.3. In the UK, PM_{10} and $PM_{2.5}$ are considered major air pollutants and as such, there are legally binding limits for annual average ambient air concentrations of PM_{10} at 40µg/m3 and $PM_{2.5}$ at 20 µg/m3(with a target for a 15% reduction in concentrations of urban background $PM_{2.5}$).

2.1.4. It should be noted, however, that the World Health Organisation (WHO) updated its air quality guidelines in 2021(World Health Organisation, 2021). The UK is yet to determine whether to adopt these guidelines in its National Air Quality Objectives and so the above information remains the most up-to-date objectives.

2.1.5. The Environment Act 2021 establishes a legally binding duty on government to bring forward at least two new air quality targets in secondary legislation by 31 October 2022; one of the targets currently in consultation concerns PM2.5, it states that for PM2.5“Annual Mean Concentration Target ('concentration target') -a maximum concentration of 10µg/m3 to be met across England by 2040”(Defra, 2022). As construction of the Proposed Development is set for completion in 2026, it is expected that construction and traffic pollution generated will not hinder the achievement of this objective by 2040 as it is likely that pollution levels will decrease overtime with the expected increased uptake of electric vehicles and other alternative fuel vehicles in line with national and local policy for transport.

2.1.6. NO_2 and PM_{10} are not mentioned within the two new air quality targets currently in consultation; however, the Committee on the Medical Effects of Air Pollutants (COMEAP)anticipates that most measures implemented to achieve reductions in $PM_{2.5}$ would also be likely to reduce concentrations of other pollutants(UK Health Security Agency, 2022).

3. References

DEFRA. (2021). *Concentrations of nitrogen dioxide*. Retrieved from Air Quality Statistics: https://www.gov.uk/government/statistics/air-quality-statistics/ntrogen-dioxide#:~:text=Nitrogen%20dioxide%20(NO2)%20is%20a,certain%20gases%20in%20the%20atmosphere.

DEFRA. (n.d.). *Effects of air pollution*. Retrieved from https://uk-air.defra.gov.uk/air-pollution/effects

USEPA . (n.d.). *Nitrogen Dioxide (NO2) Pollution*. Retrieved from https://www.epa.gov/no2-pollution/basic-information-about-no2

WHO. (n.d.). *Ambient (outdoor) air pollution*. Retrieved from https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

Air Quality Assessment

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Appendix B:
Mitigation Measures for Construction Impacts

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Table 1.1 – Dust and Air Emissions Mitigation Measures (as proposed in the IAQM Guidance (2023)) 3

1. Proposed Mitigation Measures

1.1.1. The IAQM's 2023 Construction Dust Guidance (IAQM, 2023) was utilised in the Air Quality Assessment (AQA) to assess the potential impacts of dust during the construction phase of the proposed development. The IAQM guidance provides an evaluation matrix to determine the potential risk of dust generation and the associated level of mitigation required.

1.1.2. To assess the risk of dust impacts for the construction activities, the potential impact on dust soiling and human health were treated as being 'high risk' in order to obtain mitigation measures for the worst-case scenario and apply those measures which constitute good or best practice. This Appendix highlights the proposed mitigation measure for a high risk site.

1.1.3. Based on the IAQM Guidance (2023), the mitigation measures are divided into general measures applicable to all site and measures applicable specifically to demolition, earthworks, construction and trackout. Based on the AQA, the highest risk category was applied to the site, and as such, the general mitigation measures applicable to the high-risk sites have been applied, where proportionate and within reason.

1.1.4. The following table identifies the general mitigation measures proposed to be applied to the development.

Key to the table:

H **Highly recommended**

D **Desirable**

N **Not required**

Table 1.1 – Dust and Air Emissions Mitigation Measures (as proposed in the IAQM Guidance (2023))

Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
Mitigation for All Sites – Communications				
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	N	H	H	Yes
2. 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.	H	H	H	Yes
3. Display the head or regional office contact information	H	H	H	Yes
Mitigation for All Sites – Dust Management				
4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real- time PM10 continuous monitoring and/or visual inspections.	D	H	H	Yes, including visual inspections.

Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
Site Management				
5. 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.	H	H	H	Yes
6. Make the complaints log available to the local authority when asked.	H	H	H	Yes
7. Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book.	H	H	H	Yes
8. 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.	N	N	H	Yes
Monitoring				
9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.	D	D	H	Yes, inspections are proposed to be conducted at an appropriate interval.
10. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked	H	H	H	Yes

Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
11. 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.	H	H	H	Yes
12. Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	N	H	H	Yes, if required, monitoring details will be agreed upon with the Local Authority. Visual inspections will be carried out and recorded on a daily basis.
Preparing and maintaining the site				
13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H	H	H	Yes
14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H	H	H	Yes
15. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	D	H	H	Yes
16. Avoid site runoff of water or mud.	H	H	H	No, this is not proposed as it is not practical, although street sweeping will be utilised alongside wheel washing
17. Keep site fencing, barriers and scaffolding clean using wet methods.	D	H	H	No, this is not proposed as it is not practical and in the interests of water conservation
18. Remove materials that have a potential to produce dust from site as soon as possible,	D	H	H	Yes

Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
unless being re-used on site. If they are being re-used on-site cover as described below.				
19. Cover, seed or fence stockpiles to prevent wind whipping.	D	H	H	Yes
Operating vehicle/machinery and sustainable travel				
20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable	H	H	H	N/A
21. Ensure all vehicles switch off engines when stationary - no idling vehicles.	H	H	H	Yes
22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H	H	H	Yes
23. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)	D	D	H	Yes
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N	H	H	Yes
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	N	D	H	No, this is not considered practical for this development

Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
Operations				
26. 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.	H	H	H	Yes, where practical. The use of power cutting, grinding and sawing will be discouraged.
27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H	H	H	Yes
28. Use enclosed chutes and conveyors and covered skips.	H	H	H	Yes
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H	H	H	Yes
30. 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.	D	H	H	Yes
Waste management				
31. Avoid bonfires and burning of waste materials.	H	H	H	Yes

Note. The AQA does not include emissions associated with contaminated soils.

2. References

IAQM. (2023, October 10). *Guidance on the assessment of dust from demolition and construction*. Retrieved from Institute of Air Quality Management: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-dust-2023-BG-v6-amendments.pdf

Air Quality Technical Note

Land To the North of High Bar Lane, Thakeham West Sussex

Appendix B:

Horsham District Council Consultation
(Dated 30 Oct. 2026)

HORSHAM DISTRICT COUNCIL CONSULTATION

TO:	Horsham District Council – Planning Dept
LOCATION:	Land To The North of High Bar Lane Thakeham West Sussex
DESCRIPTION:	Application to discharge Schedule 5 Air Quality Management Plan of Section 106 legal Agreement CB/12172 of planning permission DC/23/2152 (varied by DC/26/0209).
REFERENCE:	S106/26/0044
RECOMMENDATION:	Advice / No Objection / Objection / More Information / Modification / Refusal

MAIN COMMENTS:

The Air Quality Offset Contribution was agreed through the S106 agreement and therefore we have no further comments regarding the contribution amount.

In relation to the updated Air Quality Management Plan, since the original air quality assessment was undertaken there have been updates to air quality planning guidance, including guidance relating to PM2.5 and the updated Sussex Air Quality and Emissions Mitigation Guidance.

Given the scale of the development and the findings of the original assessment, we do not consider that a new Air Quality Assessment is necessary. However, we recommend that a short technical note/addendum is provided to confirm that the proposed Air Quality Management Plan has been reviewed against the current guidance and that appropriate and proportionate measures to minimise emissions and exposure have been incorporated. Where no additional measures are considered necessary, this should be briefly justified.

NAME:	Thais Delboni
DEPARTMENT:	Environmental Health
DATE:	30 Oct. 26