



Land West of Warnham Station Station Road, Warnham

Environmental Air Quality Assessment

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For Information

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1. INTRODUCTION

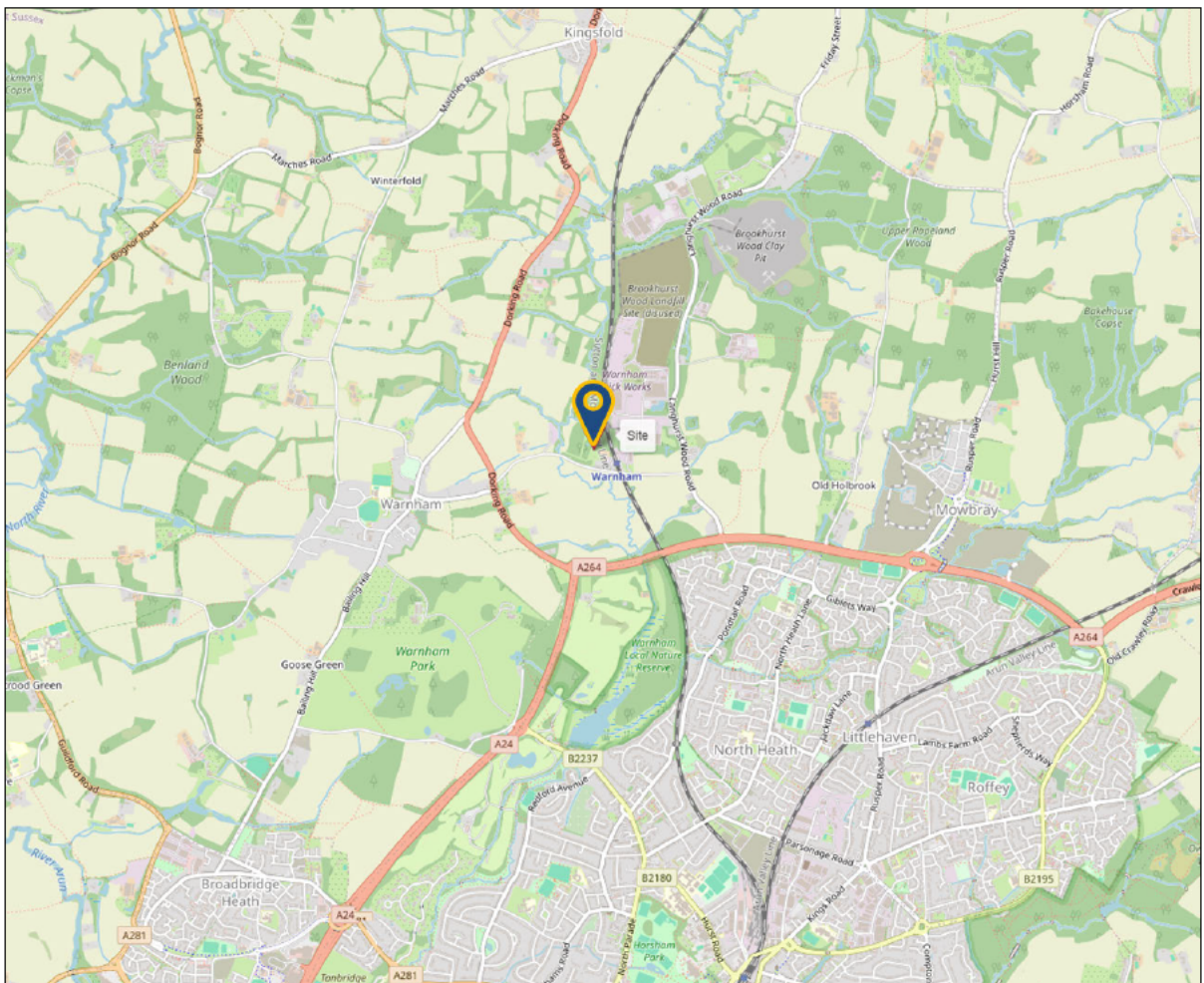
- 1.1. Quantum Air (QAir) has been commissioned by Wienerberger Ltd (client) to prepare an Air Quality Assessment to support planning application for approximately 24 new residential dwellings comprising a mix of 1 to 4 bedroom properties with associated external works and landscaping at Land to the west of Warnham Station, Station Road, Warnham, West Sussex (Site). The planning application description is as follows: *Outline application for the erection of approximately 24 residential dwellings, with all matters reserved except for access.*
- 1.2. When considering the potential air quality impacts in relation to such development, there are four fundamental air quality considerations:
 - First, the significance of existing, baseline levels of pollutants and whether existing pollutant concentrations pose a health risk for or nuisance to existing and future receptors.
 - Second, the potential significance of pollutants arising during the construction stage of the development and whether pollutant emissions will have health impacts or create nuisance for existing receptors (and future receptors, should these come into being during the proposed construction programme).
 - Third, the potential significance of pollutants arising during the operational stage of the development, including pollution associated with additional traffic that may be generated by the development and emissions associated with mechanical equipment, combustion technology and / or processes associated with the proposals; and
 - Fourth, the potential significance of pollutants during the construction and operational phases of the development in the context of any neighbouring protected habitats sites.
- 1.3. QAir has been commissioned to assess existing baseline concentrations of pollutants characterising the site and provide professional opinion regarding the site suitability for proposed development and the potential use of the site for constructing residential homes.
- 1.4. This report therefore presents a review of existing baseline pollutant concentrations at the site determine whether such baseline conditions raise any health concerns in the context of air quality objectives for England.
- 1.5. This report is structured as follows:
 - Section 2 describes the location of the site;
 - Section 3 presents the development proposals for the site;
 - Section 4 provides a commentary on air quality related legislation, governmental and regional air quality strategies and policies and national and local planning guidance;
 - Section 5 reviews background concentrations of pollutants;

- Section 6 assesses the significance of pollutants based on Air Quality Objectives for England;
- Section 7 assesses the construction dust and its mitigation;
- Section 8 assesses the transport emissions due to the proposed development site;
- Section 9 assesses the operational impacts at the proposed development site;
- Section 10 gives a statement with regard to the Sussex Emissions Mitigation Guidance;
- Conclusions are presented in Section 11.

2. SITE LOCATION

- 2.1. The proposed development is located within the jurisdiction of Horsham District Council (HDC) in close proximity to Warnham Station.
- 2.2. The development site is located approximately 1.3 km east of Warnham Village with the A264 dual carriageway approximately 500m to the south and the A24 approximately 650m to the west.

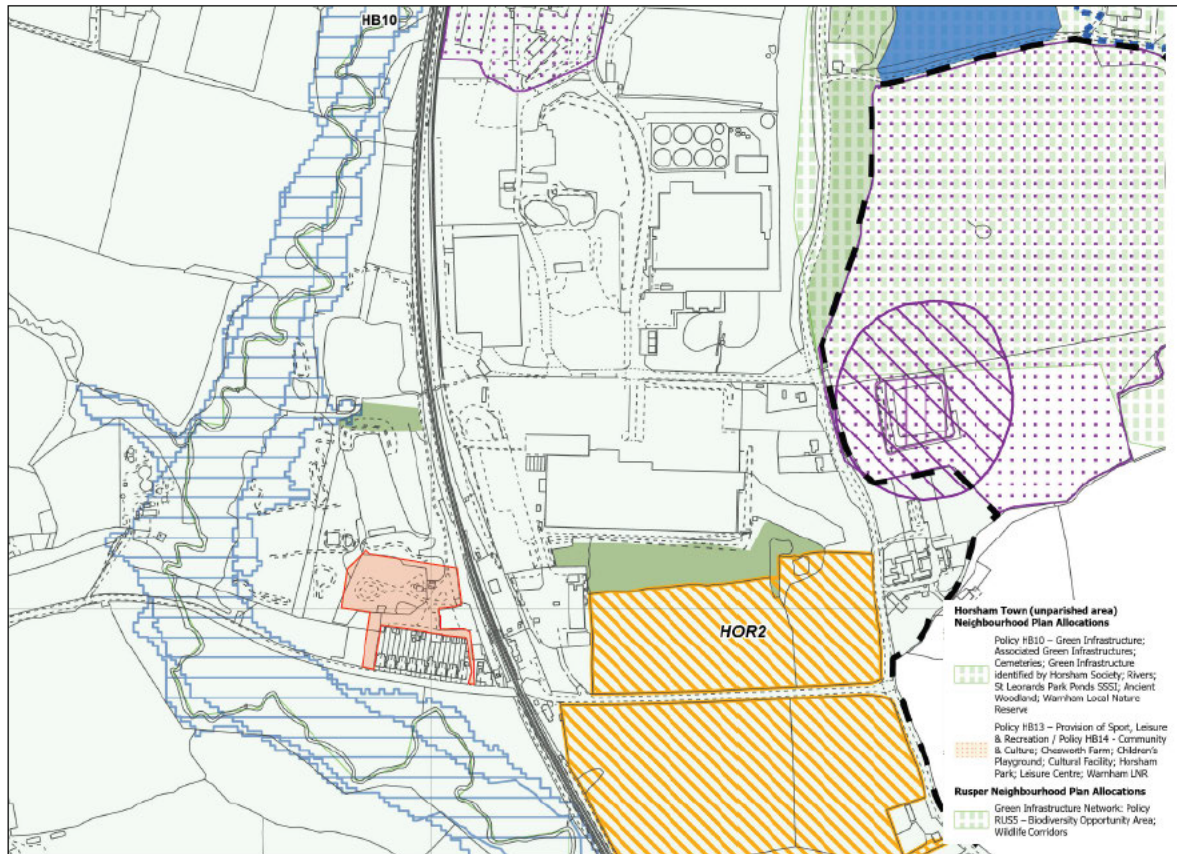
Site Location Plan (© OpenStreetMap Contributors, 2024)



- 2.3. The site is accessed directly from Station Road to the south and bounded to the east by railway line, and north/west by established woodland. To the east of the railway line is the Warnham Brickworks site, owned and operated by Wienerberger Ltd. The landfill areas and energy from waste plants are to the north and are not part of Wienerberger's operations.
- 2.4. The site lies close to the North of Horsham Strategic Site, allocated under Policy SD1 of the Horsham District Planning Framework for at least 2,600 homes alongside schools, employment, services, open space, infrastructure and a potential railway station. It is also immediately adjacent, on the opposite side of the railway line, to the proposed Mercer Road allocation (site

HOR2) in the Regulation 19 Draft Local Plan for approximately 300 homes and is not subject to any site-specific planning policy constraints. An illustration of the Local Plan map is provided below

Horsham District Council: Regulation 19 Local Plan Map. (© Source: horsham.gov.uk)



- 2.5. The site is also well placed to benefit from new active travel measures being introduced at North Horsham and on the emerging Mercer Road site allocation.
- 2.6. An illustrative representation of the red line boundary of the development is provided below.

[illegible]

3. PROPOSED DEVELOPMENT

- 3.1. Planning application is sought for *outline application for the erection of approximately 24 residential dwellings, with all matters reserved except for access.*
- 3.2. The proposed development seeks to deliver a high-quality residential environment in accordance with the objectives of the National Planning Policy Framework (NPPF). The illustrative layout demonstrates a contextually responsive, landscape-led approach to design, informed by a clear understanding of the site's constraints and opportunities, and reflects the NPPF's emphasis on achieving well-designed places through the use of deliverable housing typologies, a coherent and legible layout structure, and the provision of high-quality green infrastructure that supports residential amenity, local character, and long-term placemaking.
- 3.3. The proposed outline development aims to create a cohesive sense of place through considered building orientation, street hierarchy, public realm and landscape structure, with integrated public open space and green infrastructure enhancing visual amenity, supporting biodiversity, and reinforcing the rural and suburban character of the area.
- 3.4. An illustration of the proposed layout is provided below

Proposed illustrative layout for reference



- 3.5. Sustainability is integral to the proposed development, with a fabric-first approach guiding the design to reduce energy demand and heat loss. The scheme therefore promotes a balanced approach to sustainability, addressing environmental responsibility, social wellbeing and

economic contribution. It establishes a clear framework for delivering a high-quality residential environment that responds positively to its context, achieves exemplary design standards in accordance with Horsham planning policy, and incorporates energy-efficient, carbon-sensitive construction methods consistent with UK requirements.

4. LEGISLATION AND PLANNING POLICY CONTEXT

Legislation

The Environment Act 1995

- 4.1. Part IV of the Environment Act 1995 (as amended) requires the UK Government to publish an "*Air Quality Strategy*" (AQS) every five years. The AQS is required to set out air quality standards, objectives and measures for improving ambient air quality within the UK. In addition to the protection of human health, the AQS must also set standards and objectives for the protection of vegetation and ecosystems.
- 4.2. The Act also sets out requirements for the Local Air Quality Management (LAQM) regime, which imposes duties on Local Authorities to regularly review and assess air quality within its area.
- 4.3. In addition to the protection of human health, the AQS also sets standards and objectives for the protection of vegetation and ecosystems.

The Air Quality (England) Regulations 2000 (as amended)

- 4.4. The Air Quality (England) Regulations 2000 set out quantitative Air Quality Objectives (AQO's) for England. Pollutants covered include benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide particulate matter (PM10) and sulphur dioxide.
- 4.5. The Air Quality (England) (Amendment) Regulations 2002 introduced amended AQO's for benzene and carbon monoxide.
- 4.6. All Air Quality Objectives (AQO's) objectives include compliance dates, taking account of the economic considerations, practicability and technical feasibility of their delivery.
- 4.7. AQO's apply at locations where members of the public are regularly present. Where any of the prescribed AQO's are not likely to be achieved within any part of a Local Authority's area, the authority concerned must designate that part of its area as an "Air Quality Management Area" (AQMA). An action plan covering the designated area will then have to be prepared setting out how the authority intends to exercise its powers in relation to the designated area in pursuit of the achievement of the prescribed AQO's.

Air Quality Standards Regulations (2010) (as amended)

- 4.8. The Air Quality Standards Regulations 2010 transpose AQO's defined in EU Ambient Air Quality Directive (2008/50/EC) and the Fourth Daughter Directive (2004/107/EC) into UK legislation.
- 4.9. The Air Quality Standards (Amendment) Regulations 2016 amend the 2010 Regulations, including updated definitions for Directive 2008/50/EC and Directive 2004/107/EC: adjustments to the

criteria for the location and operation of air quality monitoring stations and new requirements for documents and reviewing the selection of monitoring sites.

[Conservation of Habitats and Species Regulations 2017 \(as amended\)](#)

- 4.10. The Conservation of Habitats and Species Regulations (as amended) are a key piece of UK Legislation aimed at conserving biodiversity by protecting habitats and species. The Regulations essentially transpose the requirements of EU Wild Birds Directive (2009/147/2009) and EU Habitats Directive (92/43/EEC).
- 4.11. The Regulations require the designation of protected habitats sites, protection of listed species and ensuring that any project that might have a significant adverse effect on a protected site is appropriately assessed and, if required, effects mitigated.
- 4.12. The Regulations were amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 to ensure the continued effectiveness of the 2017 Regulations, but transferring responsibilities previously held by EU Institutions to UK bodies and other legal and practical continuity updates.

[The Environment \(Miscellaneous Amendments\) \(EU Exit\) Regulations 2020](#)

- 4.13. The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 were introduced to address minor errors and ensure the continued effectiveness of environmental laws in the UK post-Brexit.
- 4.14. The most significant amendment was to the AQO for PM_{2.5}, to ensure that this aligned with the UK's air quality objectives.

[Environment Act 2021](#)

- 4.15. The Environment Act 2021 introduces several significant measures aimed at improving air quality management in the UK, including:
- 4.16. The setting of short-term and long-term air quality targets. Of particular note, is a legally binding target for reducing fine particulate matter (PM_{2.5}) in ambient air;
- 4.17. A requirement for the Secretary of State to review the air quality strategy at least every five years and produce an annual report to Parliament on progress towards meeting air quality objectives;
- 4.18. Enhancing the LAQM framework requiring greater cooperation between local authorities and other relevant public bodies to improve air quality;

- 4.19. A requirement for Local Authorities to declare Air Quality Management Areas (AQMA's) within 12 months of identifying an exceedance of air quality objectives and produce an Air Quality Action Plan within 18 months;
- 4.20. Amendments to the Clean Air Act 1993 to allow local authorities to impose civil penalties for breaches in smoke control areas, replacing the existing criminal offence. This specifically aims to reduce PM_{2.5} emissions from domestic stoves and fires;
- 4.21. Creating a power for the recall of vehicles and engines that do not meet environmental standards, including air emissions standards; and
- 4.22. Designating National Highways as a "*Relevant Public Authority*" and creating a legal requirement for it to work with local authorities to meet air quality standards and objectives on road networks.

Environmental Targets (Fine Particulate Matter) (England) Regulations 2023

- 4.23. These Regulations set out specific targets for the reduction of fine particulate matter (PM_{2.5}). Key targets include:
- 4.24. A requirement to reduce the annual mean concentration of PM_{2.5} to 10 µg/m³ nationwide by 2040, with an interim target of 12 µg/m³ to be achieved by January 2028; and
- 4.25. A 35% reduction in average population exposure to PM_{2.5} by 2040, with an interim target of a 22% reduction by January 2028 (both compared to 2018 baseline concentrations).
- 4.26. These new targets have been imposed to drive reductions in the worst PM_{2.5} hotspots across the country, whilst ensuring an overall nationwide improvement in air quality.

Environmental Protection Act 1990

- 4.27. Construction works may give rise to dust emissions, including coarse (PM₁₀) and fine (PM_{2.5}) particulate matter. The unreasonable exposure of individuals to dust is a matter that can be directly enforced through the provision of the Environmental Protection Act 1990, where it is held that such emissions constitute a "statutory nuisance". For the purposes of the regulations, statutory nuisances related to air quality matters include:
 - "...b - smoke emitted from premises so as to be prejudicial to health or a nuisance.
 - 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..."

- 4.28. Section 79 of the Act requires that, where a complaint regarding air quality matters falling within the remit of the Act is made by a person living within its area, a Local Authority must take reasonably practicable steps to investigate the complaint. There are no numerical thresholds which define “acceptability”, however, where the Local Authority is satisfied that a statutory nuisance exists (or could occur), it is required to service an “Abatement Notice” under Section 80 of the Act (subject to a period of seven days when alternative steps for the abatement of the nuisance can be explored).
- 4.29. Section 82 of the Act gives an aggrieved individual the power to apply directly to a Magistrates Court to seek an order for the abatement of an alleged nuisance.

Governmental Air Quality Policies and Strategies

Air Quality Plan for Nitrogen Dioxide (NO₂) in the UK (2017)

- 4.30. The Air Quality Plan for Nitrogen Dioxide (NO₂) in the UK outlines the government’s strategy to reduce roadside NO₂ concentrations and meet statutory air quality limits. Key objectives include:
- Reducing NO₂ emissions from vehicles, particularly diesel cars;
 - Requiring local authorities to develop and implement measures to achieve compliance with NO₂ limits in the shortest possible time;
 - Promotes the adoption of cleaner transport options, such as electric vehicles and public transportation;
 - The implementation of enhanced monitoring and reporting mechanisms to track progress and ensure transparency.
 - To protect public health, particularly in urban areas where pollution levels are highest.

Clean Air Strategy (2019)

- 4.31. DEFRA published its “*Clean Air Strategy*” in 2019 to tackle air pollution comprehensively across the UK. Key objectives include:
- Reducing exposure of harmful pollutants, most particularly fine particulate matter (PM_{2.5}) and nitrogen dioxide (NO₂);
 - Reducing pollutant emissions from transport, industry, agriculture and domestic heating;
 - Promoting the development and adoption of environmentally cleaner technologies and practices to support economic growth;
 - Reducing the impact of air pollution on the natural environment, including ecosystems and biodiversity; and

- Improving the monitoring and reporting of air quality to promote transparency and accountability in progress towards cleaner air.

Environment Improvement Plan (2023)

4.32. DEFRA's "*Environment Improvement Plan 2023*" is the first revision of the UK's Government's "*25 Year Environment Plan*" and sets out a detailed roadmap to enhance the natural environment in England. It builds on the Clean Air Strategy 2019, promoting the following key objectives:

- Limiting declines in biodiversity by creating and restoring wildlife habitats;
- Improving air and water quality, reducing pollution, and managing exposure to chemicals and pesticides.
- Promoting a circular economy to maximise resource efficiency and minimizing waste
- Mitigating and adapting to climate change through sustainable practices and green finance initiatives.
- Boosting "green" jobs and support farmers in adopting nature-friendly practices.

Air Quality Strategy (2023)

4.33. The latest "*Air Quality Strategy*" was published by DEFRA in April 2023. The strategy aims to improve air quality across England by setting out a comprehensive framework for local authorities. Key objectives include:

- Achieving long term air quality goals, including ambitious targets in relation to fine particulate matter (PM_{2.5}).
- Providing guidance and tools to help local council's effectively use their powers to reduce pollution and improve air quality;
- A focus on the reduction of emissions from industrial sources, domestic burning and transportation, including the stricter enforcement of environmental permits and promoting cleaner fuels;
- Promoting training, guidance and knowledge sharing among local authorities to ensure they are equipped to tackle air quality issues.

4.34. As noted earlier, this report seeks to present an air quality assessment for the proposed development. When considering the potential significance of pollution from demolition, construction and construction traffic, the principal pollutants of concern are nitrogen dioxide (NO₂) and particulate matter of size 10 and 2.5 microns (PM₁₀ and PM_{2.5}). Relevant Air Quality Objectives for these pollutants set out in the AQS are summarised in Table below.

Air Quality Objectives in the UK

Pollutant	Concentration	Measured As	Date to be achieved by (and maintained thereafter)
Nitrogen Dioxide (NO ₂)	200 µg/m ³	1-hour mean not to be exceeded more than 18 times per year	31/12/2005
	40 µg/m ³	Annual mean	31/12/2005
Particles (PM ₁₀)	50 µg/m ³	24-hour mean not to be exceeded more than 35 times per year	31/12/2004
	40 µg/m ³	Annual mean	31/12/2004
Particles (PM _{2.5})	20 µg/m ³	Annual mean	2020
	Target of 15% reduction in concentrations at urban background		Between 2010 and 2020
	12 µg/m ³	Interim annual mean target to be achieved by 2028	2028*
	Target of 22% reduction in average population exposure		
	10 µg/m ³	Legally binding nationwide annual mean target to be achieved by 2040	2040**
	Target of 35% reduction in average population exposure		

*Note: Interim PM_{2.5} targets are to be achieved by 2028.

*Note: Legally binding PM_{2.5} targets are to be achieved by 2040.

National Planning Policy

National Planning Policy Framework

4.35. The latest version of the NPPF was published in December 2024. The overall environmental objective of national planning policy is *"to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."*

4.36. Section 9 promotes sustainable transport. In relation to air quality, paragraph 109 states that:

"Transport issues should be considered from the earliest stages of plan-making and development proposals, using a vision-led approach to identify transport solutions that deliver well-designed, sustainable and popular places. This should involve:...

...

- e) identifying and pursuing opportunities to promote walking, cycling and public transport use are identified and pursued;*
- f) identifying, assessing and taking into account the environmental impacts of traffic and transport infrastructure – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains.*

4.37. Additionally, paragraph 110 states:

"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health..."

4.38. Section 15 'Conserving and enhancing the natural environment' sets out the following policy requirements in relation to air quality:

4.39. Paragraph 187:

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

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

to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; ...".

4.40. Paragraph 198:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development..."

4.41. Paragraph 199:

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

4.42. In relation to the decision-making process, paragraph 56 and 57 of the NPPF states:

"Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition.

Planning conditions should be kept to a minimum and only imposed where they are necessary, relevant to planning and the development to be permitted, enforceable, precise and reasonable in all other respects...."

Planning Practice Guidance – Air Quality

4.43. The Planning Practice Guidance (PPG) is used to support the National Planning Policy Framework and is published online. The guidance on air quality was originally published in 2014 and updated in November 2019. The PPG provides various principles on how planning can take account of the impact of new development on air quality.

4.44. Paragraph 001 Reference ID 32-001-20191101:

“What air quality considerations the planning regime needs to address?”

4.45. The NPPF Air Quality guidance includes references to relevant legislation, government policy, guidance, datasets and tools which can be utilised when assessing Air Quality.

4.46. Paragraph 002 Reference ID : 32-002-20191101:

“What is the role of plan-making with regard to air quality?”

It is important to take into account air quality management areas, Clean Air Zones, and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality”.

4.47. Paragraph 005 Reference ID : 32-005-20191101:

“When could air quality consideration be relevant to the development management process?”

Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (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.

Where air quality is a relevant consideration the local planning authority may need to establish:

- the ‘baseline’ local air quality, including what would happen to air quality in the absence of the development;
- whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and
- whether occupiers or users of the development could experience poor living conditions or health due to poor air quality...”.

4.48. Paragraph 006 Reference ID : 32-006-20191101:

“What specific issues may need to be considered when assessing air quality impacts?”

Considerations that may be relevant to determining a planning application include whether the development would:

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

4.49. Paragraph 007 Reference ID : 32-007-20191101:

"How detailed does an air quality assessment need to be?"

Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions", and because of this are likely to be locationally specific)...".

4.50. Paragraph 008 Reference ID : 32-008-20191101:

"How can an impact on air quality be mitigated?"

"Mitigation option will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with the applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented..."

Local Planning Policy

- 4.51. HDC has taken forward a number of direct measures (Horsham District Council, 2024) during the recent years in pursuit of improving local air quality. The key actions undertaken in 2023 were:
- Promotion of Walk to School Week with the support of Environmental Health, neighbourhood wardens, parking services, Sussex police and Fire brigade.
 - Replace and refurbish five vehicles in HDC's waste/recycling fleet
 - Improvement of electric vehicle charging network, including work with developers of new developments
- 4.52. Sussex Air was successful with a bid submitted for the 2021/2022 Air Quality Grant for a number of projects. Including:
- A Taxi engagement study, which Horsham District Council is leading. The purpose of this project is to facilitate a transition to electric vehicles by taxi and private hire drivers.
 - Improving Sussex automatic monitoring network, new PM2.5 analyser to be installed in Cowfold in 2024
- 4.53. Ongoing work with Planning Policy and Development Control to ensure the impacts of new development are mitigated and/or offset
- 4.54. Continuation of the monitoring programme, which includes the operation and maintenance of three air quality monitoring stations, with the data and Air Alert forecasts shared at <https://sussex-air.net/>
- 4.55. Attending Defra's workshops for Local Air Quality Management and Sussex Air partnership meetings. With this, we can take informed proactive actions
- 4.56. Air quality promotion via website and social media
- 4.57. Horsham District Council's priorities for the coming year are:
- Publishing the update of the Air Quality Action Plan for Storrington and Cowfold
 - Deliver Electric Vehicle event as part of the Defra-funded taxi engagement campaign to facilitate a transition to EV vehicles by taxi drivers
 - Continued work with Planning Policy and Development Control to secure air quality mitigation from new development
 - Continuation and expansion of the monitoring programme, to include monitoring for particulate matter

- Community engagement through participation in the Defra's funded Sussex-Air Community Engagement project
- Improvements to the air quality website and communications to make air quality information more accessible to the public
- Exploring the viability of a Smoke Control Area declaration
- Delivery of the HDC's vehicle replacement programme
- Expansion of Electric Vehicle Network
- Continued work with WSCC to increase the rate of active travel to and from schools
- Continued work with the steering groups on the development and implementation of AQAP measures
- Participation in the next bid for Defra's air quality funding
- Internal applications for s106 funding to facilitate the implementation of actions within the AQAP

Cowfold Action Plan

- 4.58. The original Action Plan for Cowfold (Cowfold AQAP, 2020) was submitted to DEFRA and published in September 2013 and accepted in December 2013. Most of the actions set out in the Cowfold Action Plan have either been completed or retracted due to low effectiveness or low feasibility. The most recent review of the identified measures has taken place in September 2017.
- 4.59. The review highlighted a number of measures for further consideration. Following further evaluation, the Cowfold Air Quality Steering Group supported progression of two main schemes that have been considered further, and which are described in further detail below:

- Improved signage on strategic routes to discourage longer distance lorry traffic from using the A272 through Cowfold;
- Realignment of A272 Bolney Road adjacent to Hunts croft Cottages.

- 4.60. The Cowfold Action Plan also includes a Smarter Choices scheme, which involves work with WSCC to enhance school travel plans, identify safety improvements to encourage walking, cycling, walking buses, and contribute to air quality awareness education programmes.

Storrington Action Plan

- 4.61. The original Action Plan for Storrington (Storrington AQAP, 2020) was submitted to DEFRA and published in October 2012 and appraised in November 2012 with the draft plan accepted as fulfilling the requirements of the Local Air Quality Management policy guidance (LAQM (PG16), 2016). Most of the actions set out in the 2012 Plan have either been completed or retracted due to low effectiveness or low feasibility.

4.62. The most recent review of the identified measures took place in June 2017. The review identified a number of schemes for further consideration. Following further evaluation, a decision was taken by the Storrington Air Quality Steering Group to prioritise the progression of three schemes:

- Prohibition of lorries turning right into School Hill from Manley's Hill within the Storrington AQMA;
- Advisory lorry route signage improvements within the Storrington AQMA; and
- Time restrictions for goods vehicle loading/delivery within the AQMA during peak periods around the North Street/A283 High Street junction.

Sussex Air Quality Guidance

4.63. A consortium of Local Authorities within Sussex have joined to produce the *Air quality and emissions mitigation guidance for Sussex (2021)*. This guidance deals with the pollutants from transport which are regulated under the Local Air Quality Management (LAQM) regime, and the assessment and control of dust during demolition and construction.

4.64. The guidance also sets out a process of assessment screening and emissions mitigation calculation where applicable. The purpose of this assessment is to quantify the monetised health damage value associated with transport emissions from the proposed development. Guidance on how to carry out emissions mitigation assessments is contained in Section 2 of the document.

Non-Regulatory Thresholds

4.65. The World Health Organization (WHO) released its "*Air Quality Guidelines Global Update*" in 2005, which was published in 2006. The update included "*Air Quality Guidelines*" (AQG's) to reduce public health impacts from the adverse effects of air pollution including health impacts such as respiratory and cardiovascular diseases and premature death.

4.66. The guidelines were updated in 2021, in response to more recent epidemiological studies which indicate adverse effects at lower levels than had previously observed. In recognition of the difficulty of meeting the AQGs in many jurisdictions, the WHO guidance also proposed a series of Interim Targets (IT's) which represent steps towards achieving the AQG's.

4.67. The AQG's are set out in the table below.

WHO Guidelines and Interim Targets

Pollutant	Time Period	Interim Target Level, $\mu\text{g}/\text{m}^3$				Air Quality Guideline Level, $\mu\text{g}/\text{m}^3$
		1	2	3	4	
Nitrogen Dioxide NO_2	1-hour mean	-	-	-	-	200
	24-hour mean	120	50	-	-	25
	Annual mean	40	30	20	-	10
Particulate Matter PM_{10}	24-hour mean	150	100	75	50	45
	Annual mean	70	50	30	20	15
Particulate Matter $\text{PM}_{2.5}$	24-hour mean	75	50	37.5	25	15
	Annual mean	35	25	15	10	5

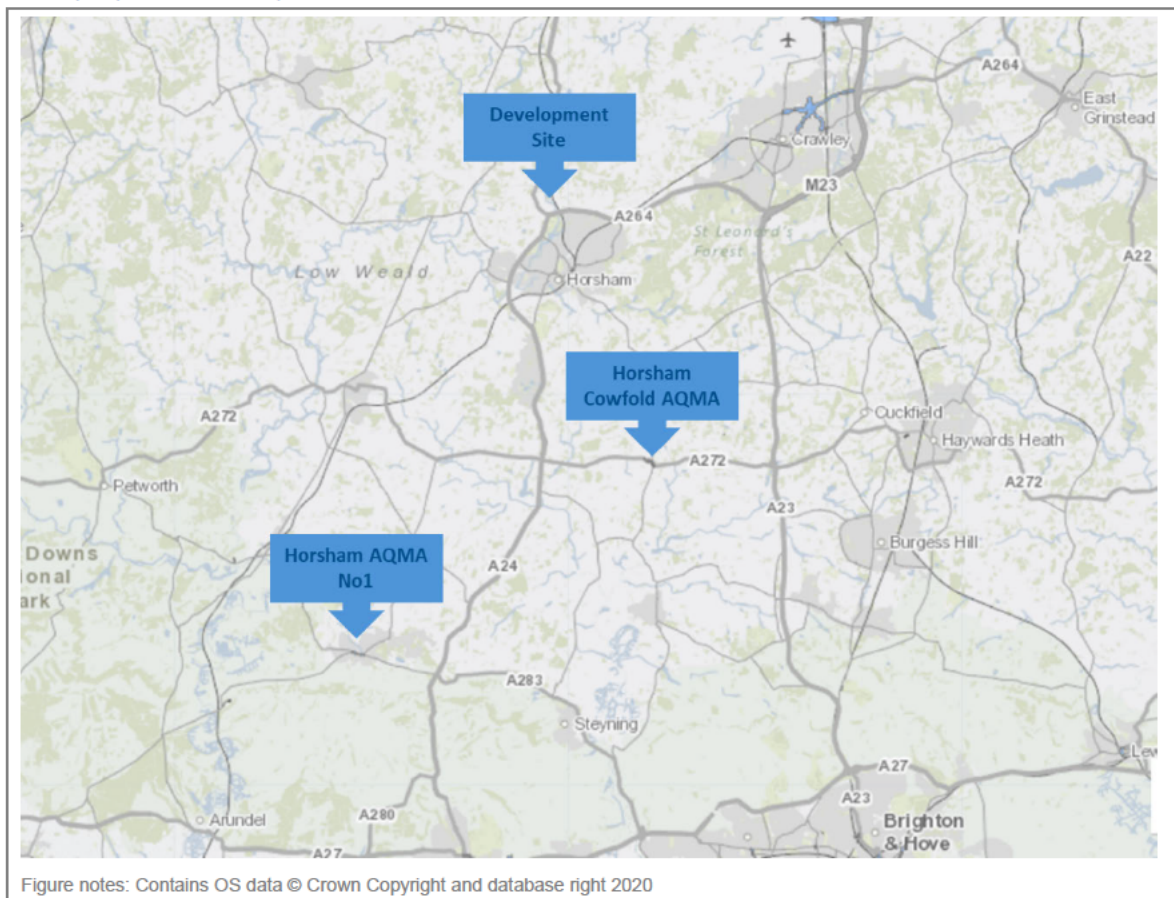
4.68. It is important to note that the AQG's and IT's do not represent legally binding values for England. The legal requirements for the UK are set out in relevant legislation and accompanying governmental Air Quality Strategy. The WHO values do have provide aspirational non-statutory benchmark reference values against which air quality impacts can be assessed.

5. BACKGROUND CONCENTRATIONS OF POLLUTANTS

- 5.1. The proposed development falls under the jurisdiction of HDC. The council has three different automatic monitoring sites out of which one of them is managed by Automatic Urban and Rural Network (AURN) which is run by the Department for Environment, Food & Rural Affairs (DEFRA) and the other two are managed by local authorities and is not a part of DEFRA's national monitoring strategy. The air quality baseline has been reviewed using the concentrations of nitrogen dioxide (NO₂), concentrations of particulate matter less than 10 micrometres in diameter (PM₁₀), and the concentrations of particulate matter less than 2.5 micrometres in diameter (PM_{2.5}).
- 5.2. This desktop study was undertaken using the Information on existing air quality, that has been obtained by collating the results of monitoring carried out by DEFRA, local authority and other available monitoring networks. This covers both the application site and the surrounding area, the latter being used to provide context for the assessment.
- The annual mean background concentrations of NO₂ and particulate matter (PM₁₀ and PM_{2.5}) have been identified using the ambient air quality interactive map published by (DEFRA, 2024). These cover the whole of the country on a 1x1 km² grid of average concentrations.
 - The annual mean roadside concentrations of NO₂ and particulate matter (PM₁₀ and PM_{2.5}) have been obtained from the results of pollution climate mapping (PCM) model for the local council WCC provided by (DEFRA, 2024a).
- 5.3. The air quality strategy, states that the local authorities have a duty to consider air quality within their boundaries and produce an annual status report.
- The annual status report (ASR) prepared by HDC (Horsham District Council, 2024) indicates that air quality within their jurisdiction is generally good. Nonetheless, historical exceedances of NO₂ levels due to the local road traffic emissions notably the A24, which intersects the district north – south; A264 to the north of Horsham; A272 and A281 at Cowfold; and A283 at Storrington prompted the establishment of two Air Quality Management Area (AQMA) Horsham AQMA No1 on 01 January 2010, and Horsham Cowfold AQMA on 22 September 2011.
 - Horsham AQMA No1 encompasses the town centre of Storrington, specifically including West Street, the High Street, and parts of School Hill and Manleys Hill. Similarly, Horsham Cowfold AQMA encompasses the Street, parts of Station Road, and Bolney Road in the village of Cowfold. The primary source of NO₂ pollution in this area is road traffic emissions, particularly from the A272 and A281 roads that intersect in Cowfold.
- 5.4. HDC operates a network of 49 diffusion tubes, strategically positioned (council wide) to estimate the concentrations of NO₂ to capture local air quality trends.

- 5.5. The annual average concentration of NO_2 was below the air quality objective at all monitoring sites, except at Storrington 19n (ID-47) within the Storrington AQMA, where the level measured $47.7 \mu\text{g}/\text{m}^3$ in 2019, exceeding the NO_2 objective.
- 5.6. The proposed development site is located at a distance of around 13 miles northeast from Horsham AQMA No1, and approximately 7.5 miles northwest of Horsham Cowfold AQMA. The site location in relation to the AQMA is illustrated in the figure below.

The proposed development site location in relation to HDC AQMA's.



- 5.7. The annual mean background concentrations of NO_2 and particulate matter (PM_{10} and $\text{PM}_{2.5}$) have been identified using the ambient air quality interactive map by (DEFRA, 2024) which contains data from the Pollution Climate Mapping (PCM) for $1 \times 1 \text{ km}^2$ grid squares. The data in the table below is taken by using the option named as "click on the feature" and find the respective concentrations. The site is located two grids of $1 \text{ km} \times 1 \text{ km}$ (Four-digit grid reference: TQ169339; TQ169340), hence we obtained the concentration data from these two grids (eastings and northings are X: 516951, Y: 133966; X: 516936, Y: 134036) and presented the annual mean concentrations in the table below.

DEFRA annual mean roadside and background concentrations for 2023

Pollutant	Limit Values ($\mu\text{g}/\text{m}^3$)	Roadside Concentrations ($\mu\text{g}/\text{m}^3$) ^a	Background Concentrations ($\mu\text{g}/\text{m}^3$) ^b	Compliance with Limit Values
NO ₂	40	15.9	7.2	✓
PM ₁₀	40	12.2	11.4	✓
PM _{2.5}	20	7.3	6.5	✓

Table notes:
^a Annual mean roadside concentrations obtained from 03 different roadside points used by the PCM model as critical exposure points for Horsham District Council
^b Annual mean background concentrations from UK ambient air quality interactive map with 1 Kilometre Grid Square Selection.
 Source: UK AIR: Air Information Resource; Link: <https://uk-air.defra.gov.uk/data/gis-mapping/>

- 5.8. The roadside concentrations of NO₂ and particulate matter (PM₁₀ and PM_{2.5}) were obtained from the results of PCM model by (DEFRA, 2024a) for the local authority (HDC) and are obtained from 03 different roadside points used by the PCM model as critical exposure points for HDC.

PCM modelling points for roadside concentrations for NO₂ and PM (PM₁₀ and PM_{2.5}) in HDC in relation to the site (green pin).

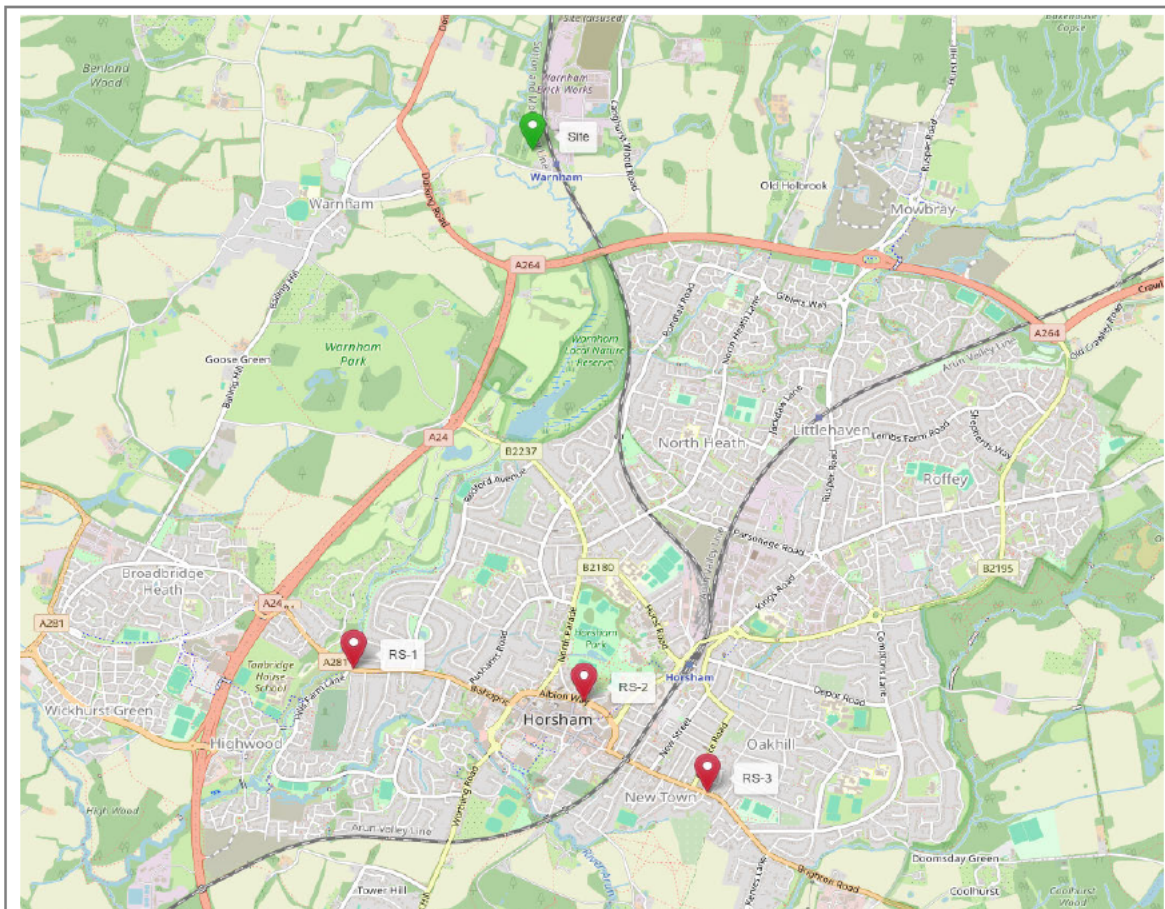
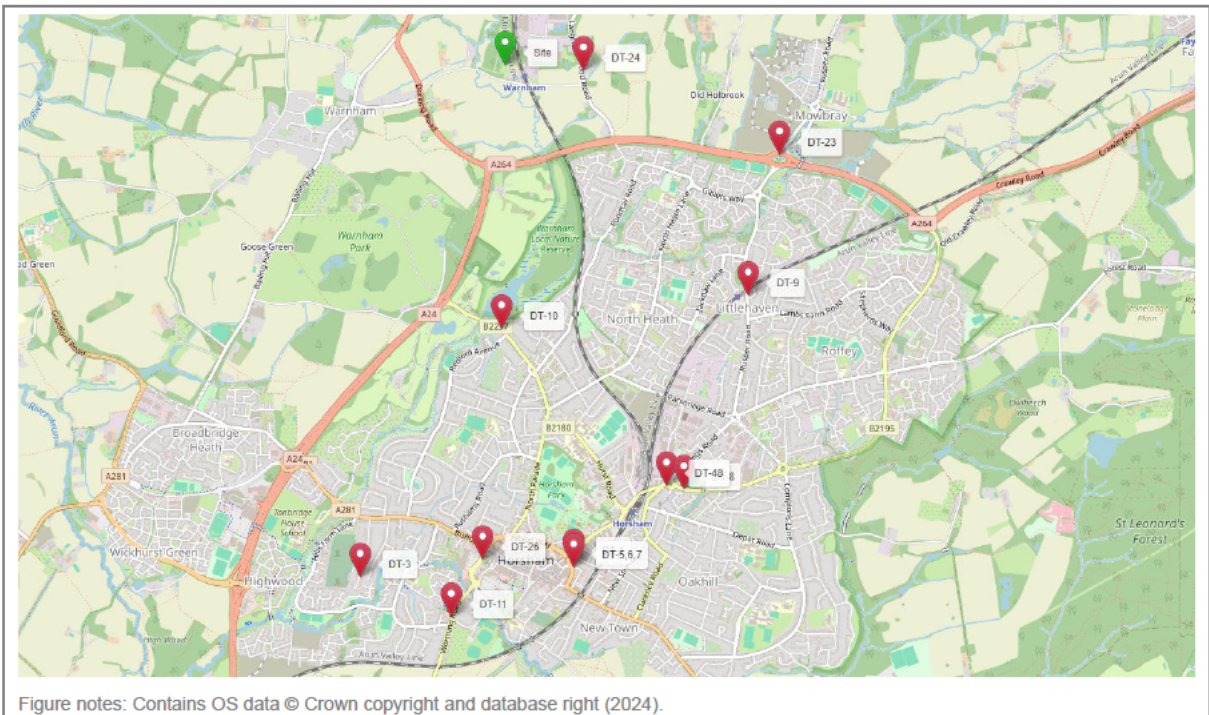


Figure notes: Contains OS data © Crown copyright and database right (2024)

- 5.9. HDC published their latest Air Quality Annual Status Report (ASR) in June 2024 (Horsham District Council, 2024) which provides annual mean concentrations of NO₂ for 2019 to 2023 monitored by the local authority. The local authority uses diffusion tube samplers to monitor the NO₂ levels within their boundaries. These are identified as non-automatic monitoring locations, and the sites in close reference to the development site are illustrated in the figure below, and their corresponding NO₂ levels are mentioned in the table below.

Location of Proposed Development Site (green pin) in relation to Non-Automatic Monitoring Sites



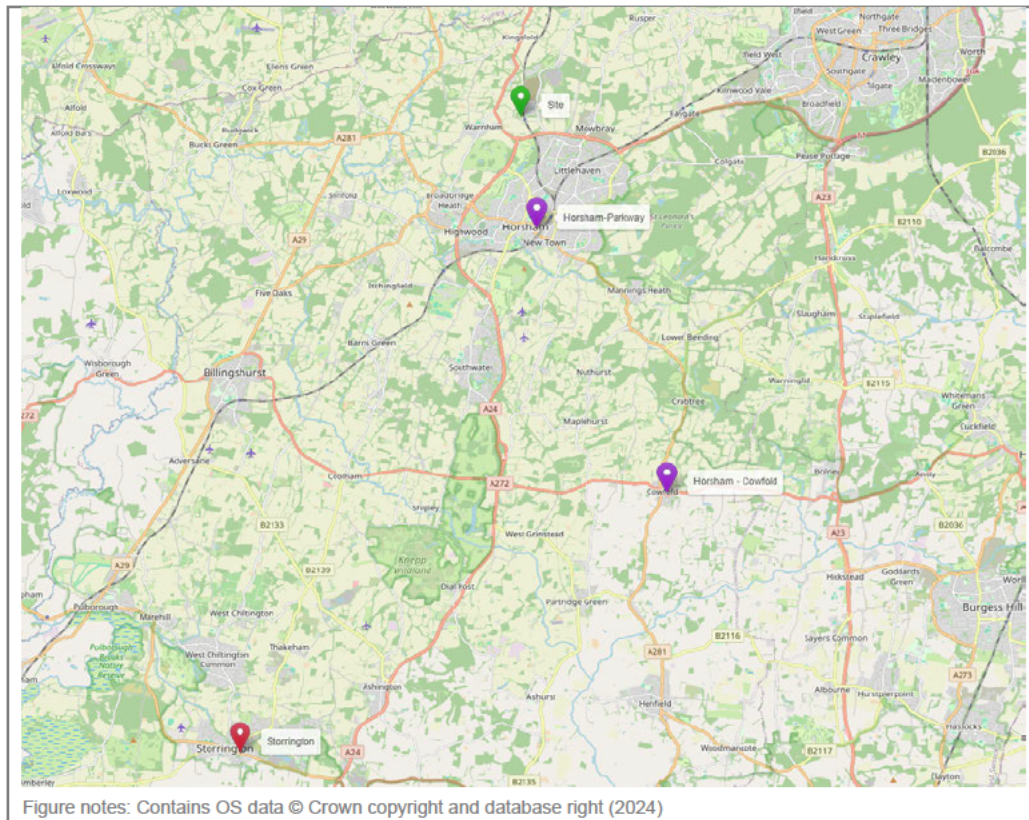
Annual mean NO₂ concentrations at the non-automatic monitoring sites in HDC for the years 2019 to 2023.

Site ID	X	Y	Type of site	^a NO ₂ annual mean concentrations (µg/m ³)				
				2019	2020	2021	2022	2023
DT-1	517489	130607	Roadside	26.4	21.6	23.2	22.6	20.9
DT-3	516008	130480	Roadside	12.5	9.5	9.9	8.8	7.6
DT-5,6,7	517489	130580	Roadside	22.1	18.4	19.9	19.6	17
DT-8	518239	131137	Roadside	25.2	21	22.7	21.6	20.4
DT-9	518654	132482	Roadside	21.5	18.2	19.5	17.6	15
DT-10	516952	132215	Roadside	23	18.6	19.4	18.9	16.6
DT-11	516646	130221	Roadside	21.9	19.1	20.7	19.9	18.7

DT-23	518845	133461	Roadside	-	-	-	-	26.2
DT-24	517476	134013	Roadside	17.3	15.8	14.6	14.1	14.1
DT-26	516853	130621	Roadside	-	-	-	-	20.1
DT-48	518118	131161	Roadside	26.5	22.1	23.3	24.1	20.3

- 5.10. As previously stated, there are three automatic monitoring stations, out of which one monitoring station is run by DEFRA and two monitoring stations are run by the local authorities.

Location of Proposed Development Site (green pin) in relation to Automatic Monitoring Sites run by DEFRA (red pin) and local authorities (purple pins)



- 5.11. The type of pollutants monitored, and the location of the automatic monitoring sites managed by DEFRA (Storrington), and locally managed monitoring sites (Horsham - Park Way, and Horsham - Cowfold) (DEFRA, 2024b) are provided in the table below.

Annual mean concentrations of NO₂, PM₁₀, and PM_{2.5} and at the automatic monitoring sites managed by DEFRA in HDC for the years 2018-2025 (data obtained on 09th May 2025)

Site Name	Coordinates	Site Type	Pollutant	Annual Mean Concentrations (µg/m ³)							
				2018	2019	2020	2021	2022	2023	2024	2025
Storrington	509086, 114197	Urban Traffic	NO ₂	23.0	22.0	17.4	19.9	18.7	17.4	16.6	18.9
			PM ₁₀	-	-	-	-	-	-	12.2	21.3
			PM _{2.5}	-	-	-	-	-	-	6.8	12.9

Table notes:
 Data obtained from DEFRA UK AIR: Information resource.
 Storrington AURN Link: https://uk-air.defra.gov.uk/networks/site-info?uka_id=UKA00548

Annual mean concentrations of NO₂, PM₁₀, and PM_{2.5} and at the automatic monitoring sites locally managed by WCC for the years 2018-2025 (data obtained on 09th May 2025)

Site Name	Coordinates	Site Type	Pollutant	Annual Mean Concentrations (µg/m ³)							
				2018	2019	2020	2021	2022	2023	2024	2025
Horsham - Park Way (Horsham)	517485, 130585	Urban Traffic	NO ₂	25.4	24.4	18.8	21.1	18.2	16.1	16	23.2
			PM ₁₀	16.1	19.2	15.8	17.5	19.4	20.5	16.2	21.3
			PM _{2.5}	-	-	-	-	-	-	-	-
Horsham - Cowfold	521500, 122497	Urban Traffic	NO ₂	27.8	23.6	23.4	20.3	21	24.3	17.3	-
			PM ₁₀	-	-	-	-	-	-	-	-
			PM _{2.5}	-	-	-	-	-	-	-	-

Table notes:
 Data obtained from DEFRA UK AIR: Information resource.
 Horsham - Park Way Link: https://uk-air.defra.gov.uk/networks/site-info?uka_id=HO2&provider=sussex
 Horsham - Cowfold Link: https://uk-air.defra.gov.uk/networks/site-info?uka_id=HO5&provider=sussex

Industrial Uses

- 5.12. There are three different types of industries in the vicinity of the site, with the Brookhurst Wood MBT (Mechanical Biological Treatment) facility located at a distance of approximately 0.47 miles northeast to the site, followed by Wienerberger Ltd., Warnham Works (brick manufacturers) and Biffa Waste Management facilities located at distance of approximately 0.2 and 0.3 miles east of the site.
- 5.13. The UK Pollutant Release and Transfer Register (PRTR) data set for these industries do not record any air pollutant release for the year 2023 (DEFRA, 2023). Consequently, the development site and the industrial activities around the vicinity of the site does not significantly contribute to air pollution, apart from emissions associated with road traffic. The location of the industries in reference to the development site are illustrated in the figure below.

Location of Proposed Development Site (green pin) in relation to Automatic Monitoring Sites run by DEFRA (red pin) and local authorities (purple pins)

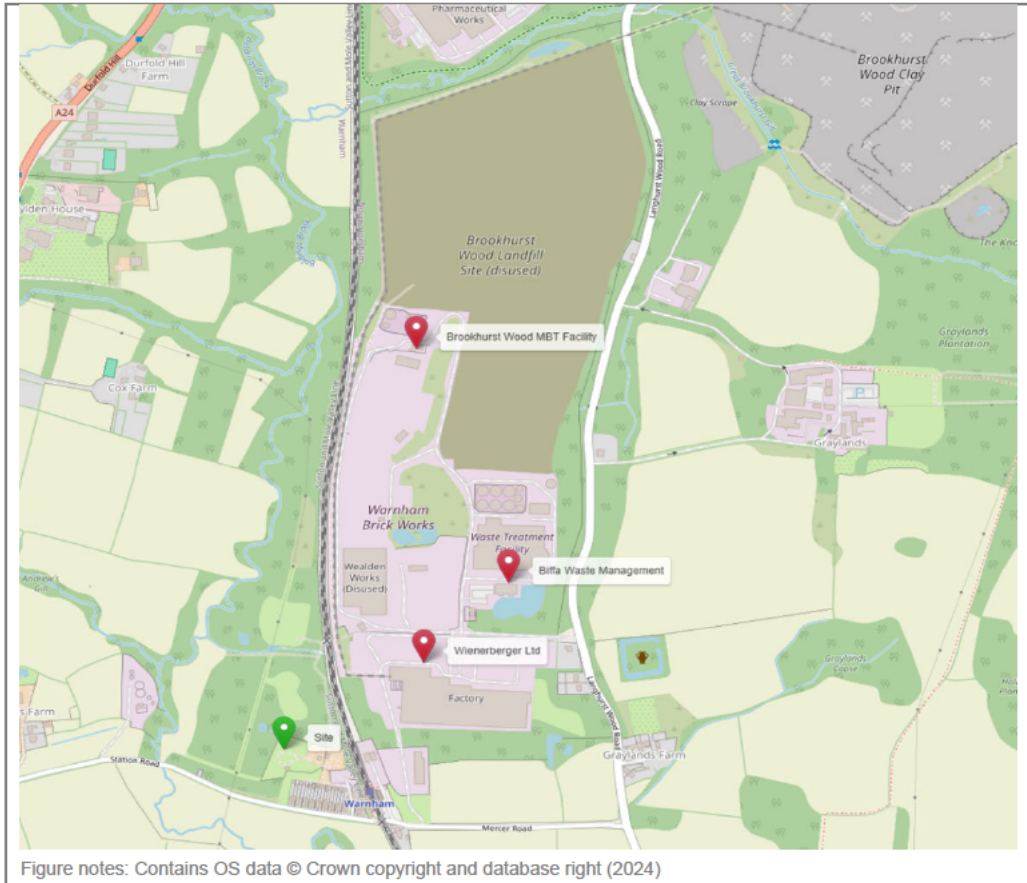


Figure notes: Contains OS data © Crown copyright and database right (2024)

- 5.14. This report focuses on air quality assessment and its related health effects concerning the proposed development. Based on the available data, the health impacts from industrial sources in the area are negligible or insignificant.

6. ASSESSMENT

- 6.1. The desktop assessment of air quality for site suitability is made using the concentrations available from the DEFRA: UK AIR Information Resource, automatic monitoring sites in the HDC run by DEFRA, and locally managed automatic monitoring sites run by HDC and predicted PCM modelled results from DEFRA, and the non-automatic monitoring stations governed by the local district council.

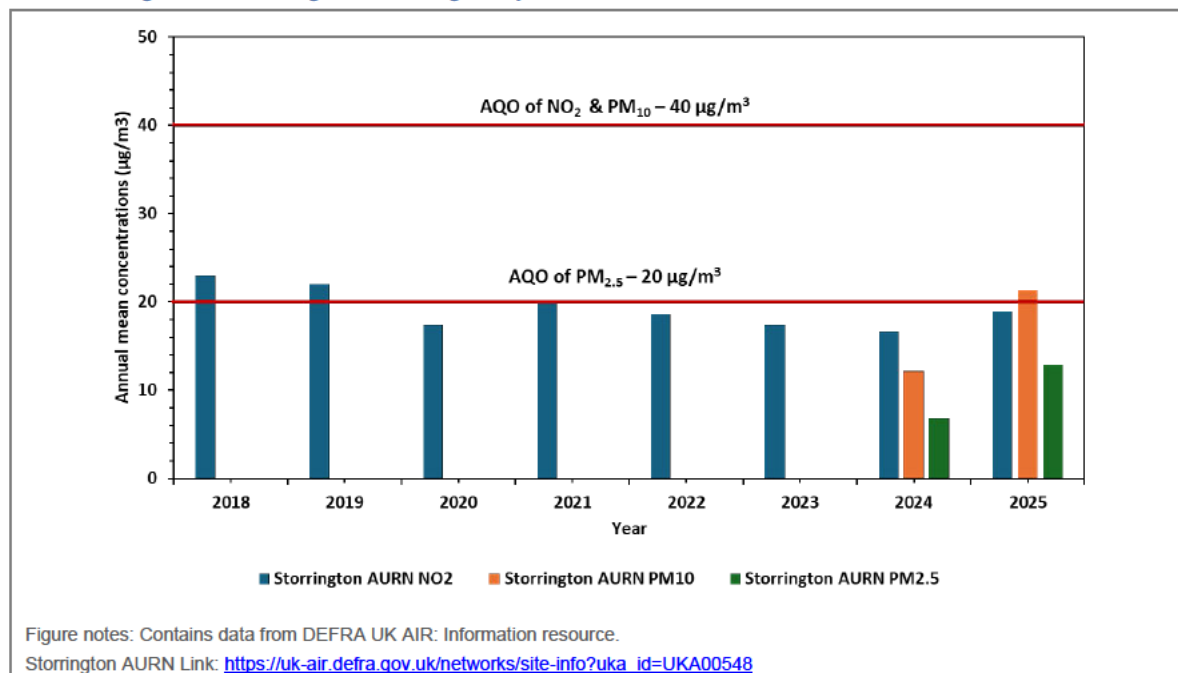
Review of Air Quality Baseline Conditions

- 6.2. The Proposed Development site is located at a distance of around 13 miles northeast from Horsham AQMA No1, and approximately 7.5 miles northwest of Horsham Cowfold AQMA. The pollutants are reviewed with the aid of the automatic and non-automatic monitoring stations run by DEFRA and HDC.
- 6.3. The baseline concentrations of pollutants are considered in relation to three separate types of criteria, covered by different legislation, policy, and guidance. These include Air Quality Objectives (AQOs), Limit Values (LVs), and Air Quality Guidelines (AQGs).

Air Quality Objectives

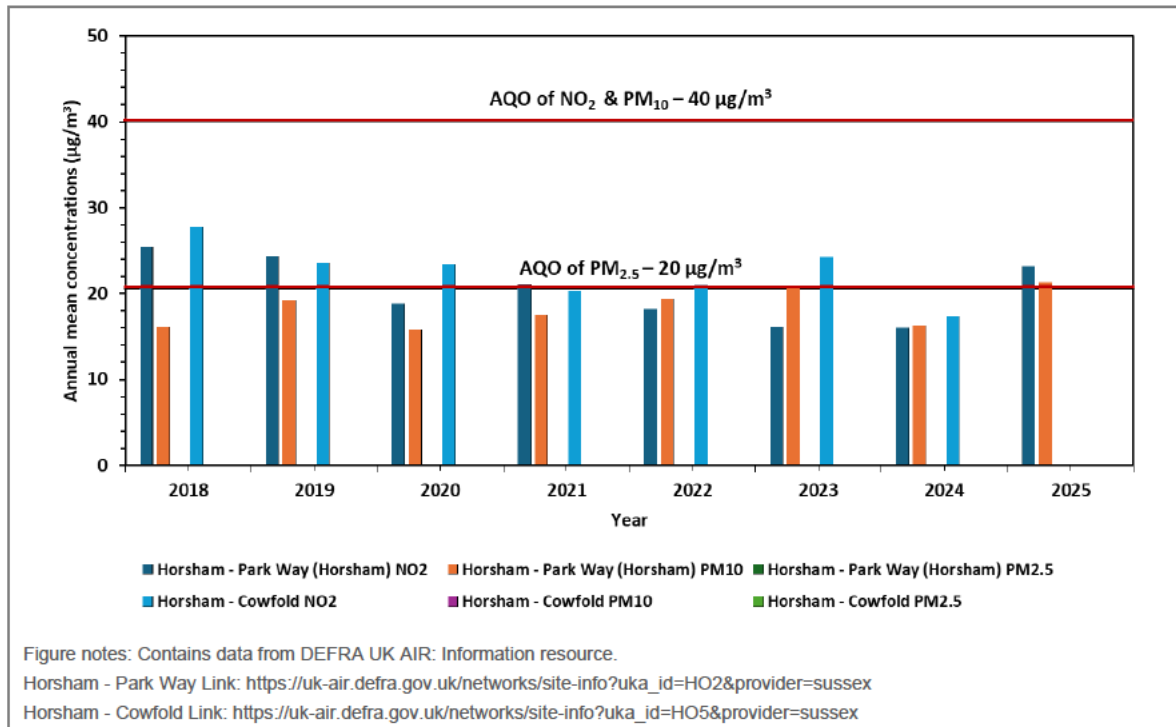
- 6.4. Measured NO₂ concentrations at the automatic monitoring sites in HDC run by DEFRA have not recorded any exceedances of the annual mean AQO of 40 µg/m³ between the years of 2018 to 2025, and the PM₁₀ and PM_{2.5} concentrations were found to be well under the AQO of 40 µg/m³ and 20 µg/m³ for the years 2024 to 2025.

Annual Mean concentrations of NO₂ and PM_{2.5} measured for 2018-2025 at the Automatic Monitoring Site (Storrington) managed by DEFRA



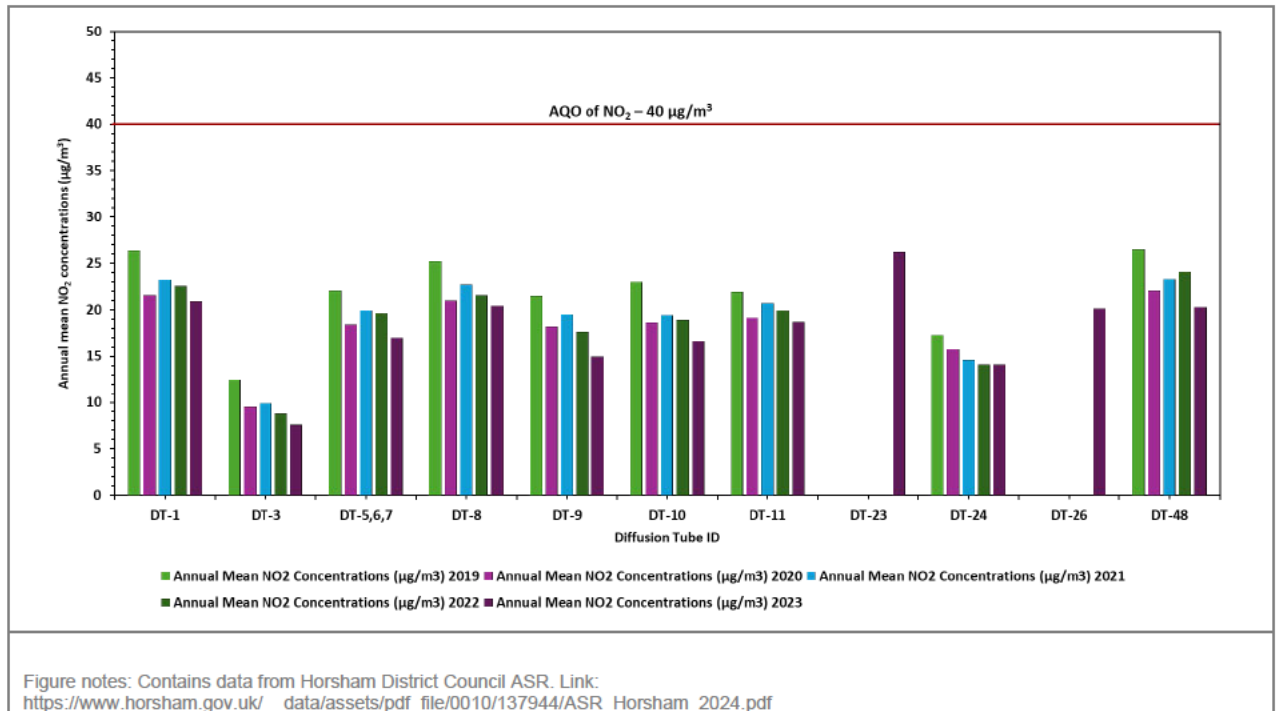
- 6.5. Similarly, the automatic monitoring sites run by local borough council have not recorded any exceedances for NO₂ and PM₁₀ concentrations for the years 2018 to 2025.

Annual Mean concentrations of NO₂ and PM₁₀ measured for 2018-2025 at the Automatic Monitoring Sites managed by HDC



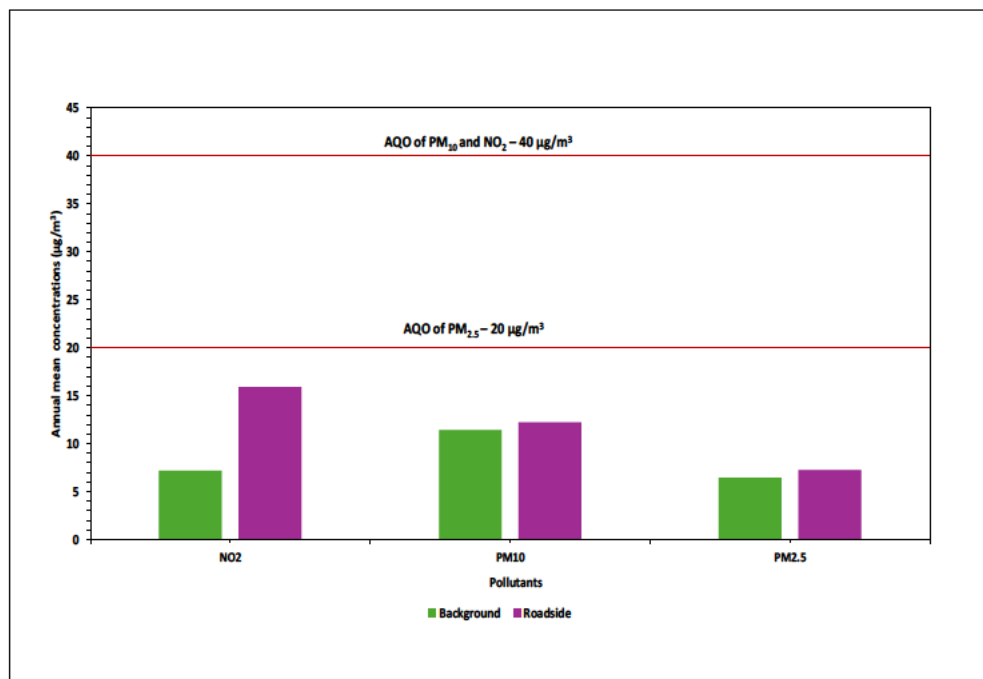
- 6.6. The local council (HDC) operated 49 non-automatic monitoring sites council wide to measure concentrations of NO₂. However, we are considering the sites which are in close relation to the development site. The sites near the proposed development site does not record any exceedances during the years 2019 to 2023. The concentrations of all the non-automatic monitoring sites in close relation to the site for years 2019 to 2023 and their annual mean concentration for 2023 are depicted in the figure below to show the level of air quality at the proposed development site and its surroundings.

Annual Mean concentrations of NO₂ measured for 2019 to 2023 at the non-automatic Monitoring Sites



- 6.7. The DEFRA mapped annual mean background and roadside concentrations of NO₂, PM₁₀, and PM_{2.5} from the national Pollution Climate Mapping modelling did not exceed AQO of 40 µg/m³ for NO₂, and PM₁₀. Similarly, the PM_{2.5} concentrations did not exceed the AQO of 20 µg/m³ for the year 2023 in the vicinity of the Proposed Development and illustrated in the figure below.

Annual Mean concentrations of PM₁₀, NO₂ and PM_{2.5} from DEFRA's national Pollution Climate Mapping



Limit Value Compliance

- 6.8. Defra have not identified any exceedances of the LVs in the current scenario and in the future up to year 2030 in the PCM modelled results for NO₂, PM₁₀, and PM_{2.5} along the roads in the local area of the Proposed Development. The tables below provide an indication that the air quality levels in the proposed development and its surroundings are well under the AQO and limit values portraying a safe level of air quality.

Annual mean concentrations of NO₂ from DEFRA's national Pollution Climate Mapping modelling for the years 2018-2030.

Year	Annual Mean NO ₂ concentrations (µg/m ³)		Compliance with Limit Values (40 µg/m ³)
	Background Concentrations	Roadside Concentrations	
2018	14.7	24.7	✓
2019	14.2	23.6	✓
2020	13.6	22.4	✓
2021	13.1	21.2	✓
2022	12.6	20.0	✓
2023	12.2	19.0	✓
2024	11.7	18.0	✓
2025	11.3	17.0	✓
2026	11.1	16.2	✓
2027	10.8	15.5	✓
2028	10.6	14.8	✓
2029	10.4	14.2	✓
2030	10.2	13.7	✓
The mean concentrations are taken from road A281			

Annual mean concentrations of PM₁₀ and PM_{2.5} from DEFRA's national Pollution Climate Mapping modelling for the years 2018-2030.

Year	Annual Mean PM Concentrations (µg/m ³)		Compliance with Limit Values
	PM ₁₀ (LV - 40 µg/m ³)	PM _{2.5} (LV - 20 µg/m ³)	
2018	17.4	11.4	✓
2020	16.8	11.0	✓
2025	15.9	10.2	✓
2030	16.0	10.3	✓
The mean concentrations are taken from road A281			

World Health Organization Guidelines

- 6.9. The table below provide an indication of the baseline air quality for the Proposed Development site with respect to the WHO annual mean ITs and AQGs

Indicative Achievement of Annual Mean WHO Guidelines / Interim Targets ($\mu\text{g}/\text{m}^3$) on the Proposed Development site

Pollutant	IT1	IT2	IT3	IT4	AQG
NO ₂	✓	✓	✓	n/a	x
PM ₁₀	✓	✓	✓	✓	x
PM _{2.5}	✓	✓	✓	✓	x
Table notes: ? may achieve IT/AQG; x IT/AQG not achieved; ✓ IT/AQG achieved; n/a not applicable.					

- 6.10. The figures and tables provided in this section and the previous section portrays that the concentrations of air pollutants, such as NO₂, PM₁₀, and PM_{2.5} from the automatic and non-automatic monitoring stations from the vicinity of the proposed development site, is showing no exceedances of the mean national air quality objectives and limit values for the years 2018-2023. In addition, the mean concentrations predicted up to year 2030 falls under the compliance of limit values.
- 6.11. Therefore, this desktop analysis for the proposed development site demonstrates that the annual mean concentrations of NO₂, PM₁₀, and PM_{2.5} for the existing scenario and the future predictions are all below national objective.

7. CONSTRUCTION DUST ASSESSMENT

- 7.1. In January 2024, the Institute of Air Quality Management (IAQM) released Version 2.2 of its updated guidance on the *Assessment of Dust from Demolition and Construction*. This latest version (IAQM, 2024) represents a comprehensive rewrite of the original 2014 guidance, incorporating lessons learned and advancements made over the past decade. In this assessment we have considered IAQM's construction guidance (IAQM, 2024) to assess the construction dust management.
- 7.2. The updated guidance replaces all previous versions and provides developers, consultants, and environmental health practitioners with a systematic framework for conducting construction dust impact assessments. It aids in determining the significance of impacts and identifying appropriate mitigation measures to eliminate or minimize potential effects.
- 7.3. The IAQM provides guidance on a five-step process to assess the potential impacts of construction dust pre-mitigation, provide mitigation measures specific to the risk and assess the post-mitigation impacts.
- 7.4. The assessment procedure follows the following framework:
- Step 1 - Screen the requirement for a more detailed assessment;
 - Step 2 - Assess the risk of dust impacts of the four phases of construction (demolition, earthworks, construction and trackout), taking into account:
 - the scale and nature of the works, which determines the potential Dust Emission Magnitude (Step 2A); and
 - the sensitivity of the area (Step 2B).
 - These factors are combined to give the risk of dust impacts (Step 2C).
 - Step 3 - Determine the site-specific mitigation for the potential activities;
 - Step 4 - Examine the residual effects and determine whether or not these are significant; and
 - Step 5 - Prepare the Construction Dust Assessment.

Steps of Assessment

- 7.5. Step 1 of the assessment procedure is to screen the need for a detailed assessment. The guidance provides distance-based criterion in Box 1 of the guidance which states:

An assessment will normally be required where there is:

- a 'human receptor' within:
 - 250 m of the boundary of the site; or

- 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).
 - an 'ecological receptor' within:
 - 50 m of the boundary of the site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).
- 7.6. There are human receptors within the distances set out in the guidance thus a detailed assessment is required for human receptors.

The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

- 7.7. The guidance explains that the dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large. The guidance provides examples of the magnitude classification for each of the potential stages.

Demolition

- 7.8. There will be a requirement to demolish the existing buildings scattered in the site. The total volume of which is estimated to be 1808 m³. There will be no crushing or screening on-site, but there will be demolition of metal cladding and timber, and the demolition site is located at a height <6m. Based on the illustrative criteria in the IAQM guidance, the dust emission class for demolition is considered *Small*

Earthworks

- 7.9. There are earthworks to be carried out for the proposed development. The total area involved in the earthworks is 2180 m², and the type of soil parent material is claystone/mudstone. Although the soil material is susceptible to becoming airborne when dry, the earthworks area represents only 12% of the threshold for the small category under the guidance. Consequently, based on the illustrative criteria in the IAQM guidance, the dust emission magnitude for earthworks is classified as *Small*.

Construction

- 7.10. The proposed development includes the development of 24 residential dwellings. The total volume for construction will be approximately 13952 m³. The exact building materials are concrete, metal cladding, micro rib cladding, aluminium, steel, glass and red brickworks. Based on the illustrative criteria in the IAQM, the dust emission magnitude for construction is considered *Medium*.

Track out

- 7.11. The number of HDVs leaving the site on a single day are unknown. Based on the site area and proposed building volume there are expected to be between <20 HDV movements per day. These HDVs may lead to dust and dirt being tracked out. Although there are no unpaved roads on or near the site, residential properties are located within 50 m of the vehicle access routes. The soil material is also prone to becoming suspended once dried, increasing the likelihood of material being tracked onto the public highway. Based on the relevant guidance, the dust emission magnitude for trackout is therefore assessed as *Medium*.

Summary of Potential Dust Emission Magnitude

- 7.12. The table below summaries the dust emission magnitude from the construction phases of the Proposed Development.

Construction Dust Assessment	
Activity	Dust Emission Magnitude
Demolition	Small
Earthworks	Small
Construction	Medium
Track out	Medium

Sensitivity of the Study Area

- 7.13. The guidance explains that the sensitivity of the area should take account of a number of factors including:
- the specific sensitivities of receptors in the area;
 - the proximity and number of those receptors;
 - in the case of PM₁₀, the local baseline concentration; and
 - site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.
- 7.14. The guidance document provides examples of high, medium and low sensitivity receptors for each of the potential effects. These are provided in Box 6 to Box 8 of the guidance and consideration should be given to the additional factors presented in Box 9 of the IAQM guidance. The guidance also provides a series of matrices (Tables 2, 3 and 4 of the guidance document) to determine the sensitivity of the area based on the receptor sensitivity, number of receptors, the

proximity to the dust emission activity and baseline PM₁₀ concentration. Residential properties are considered high sensitivity receptors to dust soiling and elevated levels of PM₁₀.

- 7.15. The site is located on the outer part of Warnham, a rural village in the Horsham district of West Sussex, England. The site lies just south of Station Road, close to the cluster of residential properties property lies to the southern boundary. The Warnham Railway Station is located approximately 150 m to the east of the development site. The Wienerberger brick manufacturers and Biffa waste management facilities are located at a distance of approximately 250 m and 500 m to the northeast of the development site. The area around the site features a blend of rural landscape, open fields, and dispersed residential properties typical of West Sussex.
- 7.16. We understand there are 18 highly sensitive receptors within 20 m to the north and west, indicating high sensitivity. There are no other highly sensitive receptors within a 250m radius. The brick manufacturers, waste management facilities and the short stay car parks of the Warnham railway station are within 100 m to 250 m distance, which all fall under medium to low sensitive receptors and some of these receptor types are a greater distance than 250m. Based on Table 2 of the IAQM guidance, the area's overall sensitivity to dust soiling impacts is *high*.

Location of the receptors and the boundaries in accordance with the guidance

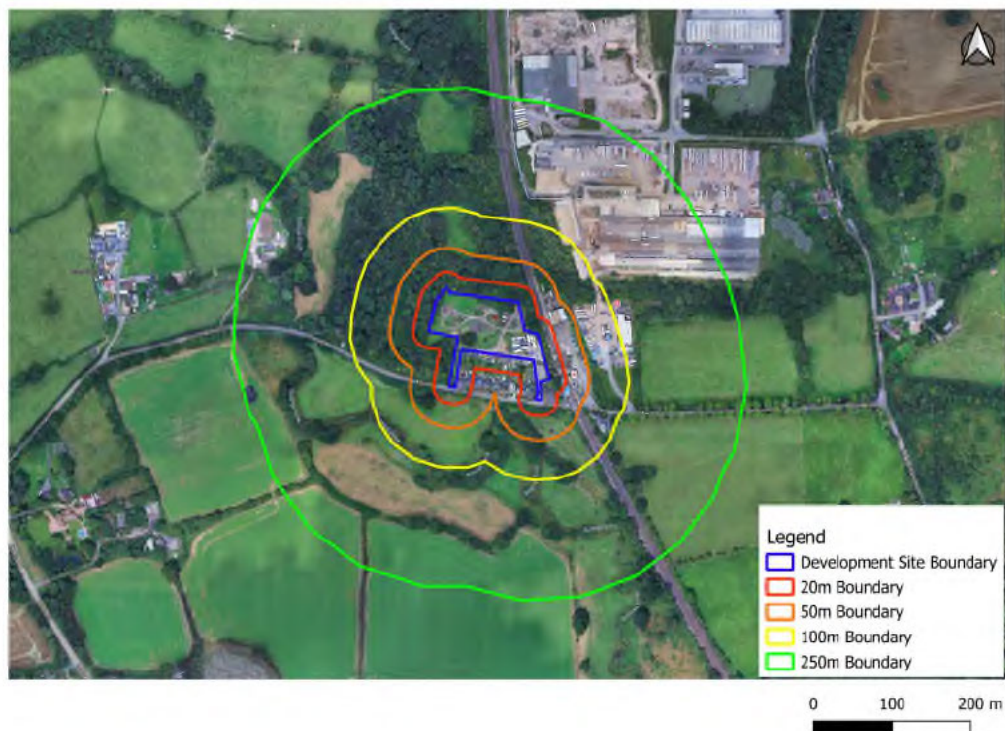


Figure notes: Contains OS data © Crown copyright and database right (2024)

- 7.17. Annual mean PM_{10} predicted background concentrations in the vicinity of the Proposed Development are predicted to be a maximum of $11.4 \mu g/m^3$. There are around 10-100 high sensitivity receptors that are likely to be exposed to these concentrations within 250 m of the application site. However, the levels of PM_{10} in the vicinity of the proposed development are very low. Based on Table 3 of the IAQM guidance, the sensitivity of the area to human health impacts due to levels of PM_{10} during the demolition, construction and track out stages will be *Low*.
- 7.18. There are no sensitive ecological sites that are within 50 m of the application site. The nearest ecological site is the Local Nature Reserve (LNR) Warnham LNR Areas located ~0.8 miles south of the site. The location of the site in relation the ecological sites are mentioned in the figure below. Based on Table 4 of the IAQM guidance, the sensitivity of the area to ecological impacts due to dust during the demolition, construction and trackout stages will be *Negligible*.

Location of ecological receptors in relation to the development site



Summary of sensitivity of the surrounding area with respect to the development site

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Low
Ecology	Low	Low	Low	Low

Table notes:
IAQM Guidance states that trackout may occur along the public highway for up to 500 m from large magnitude sites, 200 m from medium magnitude sites, and 50 m from small magnitude sites, as measured from the site exit.

Risk of Dust Effect

- 7.19. The guidance has, helpfully, provided a series of matrices to determine the potential impact at receptors based on the receptor sensitivity, number of receptors and the proximity to the dust emission activity.
- 7.20. The dust emission magnitudes have been combined with the sensitivities of the area in using the matrices in the guidance, in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in the table below.

Summary of Dust Risk for each Stage of construction at the proposed development

Potential Impact	Risk			
	Demolition ^a	Earthworks ^b	Construction ^c	Trackout ^d
Dust Soiling	Medium Risk	Low Risk	Medium Risk	Medium Risk
Human Health	Negligible	Negligible	Low Risk	Low Risk
Ecological	Negligible	Negligible	Low Risk	Low Risk

Table notes:
a. Based on Table 6 of the IAQM guidance document.
b. Based on Table 7 of the IAQM guidance document.
c. Based on Table 8 of the IAQM guidance document.
d. Based on Table 9 of the IAQM guidance document.

Significance of effects

- 7.21. The IAQM guidance does not provide a method for assessing the significance of effects before mitigation and advises that pre-mitigation significance should not be determined.
- 7.22. Step 3 - The risk categories set out in the table above have been used to determine the appropriate level of mitigation as set out in step 3 of the assessment procedure.

Mitigation

- 7.23. Measures to mitigate emissions will be required during the demolition and construction phase of the proposed development in order to minimise impacts upon nearby sensitive receptors.
- 7.24. The Proposed Development has been identified as medium risk for dust soiling effects during the construction and trackout phase, and low risk for demolition and earthworks phase. In terms of human health, the proposed development has been identified as low risk during the demolition, construction, and track out phase. Finally, in terms of Ecological receptors, the risk is negligible with respect to the demolition and earthworks and low risk during construction and trackout phases of the proposed development.
- 7.25. The IAQM guidance document describes measures that should be employed, as appropriate, to reduce the impacts. In addition to this the IAQM has also published guidance on monitoring during demolition and construction (IAQM, 2018). Based on the finding of this assessment, a set of measures that are both highly recommended and desirable to be incorporated into the specification for the construction works has been drawn up. These measures are shown in the tables below.
- 7.26. The mitigation measures for the application site should be written into a dust management plan (DMP). The DMP may be integrated into a Code of Construction Practice or the Construction Environmental Management Plan and may require monitoring.
- 7.27. Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Communication

Measure	Highly Recommend / Desirable
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	Highly Recommended
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.	Highly Recommended
Display the head or regional office contact information.	Highly Recommended

Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM ₁₀ continuous monitoring and/or visual inspections, this may also be dependent upon Local Authority requirements.	Highly Recommended
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Dust Management

Measure	Highly Recommend / Desirable
Site Management	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	Highly Recommended
Make the complaints log available to the local authority when asked.	Highly Recommended
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.	Highly Recommended
Monitoring	
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.	Desirable
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.	Highly recommended
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.	Highly recommended
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.	Highly recommended
Preparing and maintaining the site	

Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	Highly Recommended
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	Highly Recommended
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	Highly Recommended
Avoid site runoff of water or mud.	Highly Recommended
Keep site fencing, barriers and scaffolding clean using wet methods.	Highly Recommended
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.	Highly Recommended
Operating vehicle/machinery and sustainable travel	
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable	Not Applicable
Ensure all vehicles switch off engines when stationary - no idling vehicles.	Highly Recommended
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	Highly Recommended
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).	Desirable
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	Desirable
Operations	
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.	Highly Recommended
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	Highly Recommended

Use enclosed chutes and conveyors and covered skips.	Highly Recommended
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Highly Recommended
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.	Highly Recommended
Waste management	
Restrict bonfires and burning of waste materials.	Highly Recommended
Reuse and recycle waste to reduce dust from waste materials.	Highly Recommended

Measures specific to demolition

Measure	Highly Recommend / Desirable
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Desirable
Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	Highly Recommended
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	Highly Recommended
Bag and remove any biological debris or damp down such material before demolition.	Highly Recommended

Measures specific to earthworks

Measure	Highly Recommend / Desirable
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	Desirable
Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	Desirable

Only remove the cover in small areas during work and not all at once.	Desirable
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Measures specific to Construction

Measure	Highly Recommend / Desirable
Avoid scabbling (roughening of concrete surfaces) if possible.	Desirable
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.	Highly Recommended
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.	Desirable
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	Desirable

Measures specific to track out

Measure	Highly Recommend / Desirable
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.	Highly Recommended
Avoid dry sweeping of large areas.	Highly Recommended
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Highly Recommended
Record all inspections of haul routes and any subsequent action in a site logbook.	Highly Recommended
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	Highly Recommended
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	Highly Recommended

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.	Highly Recommended
Access gates to be located at least 10 m from receptors where possible.	Highly Recommended

Summary of Construction Dust Assessment

- 7.28. The construction dust assessment for the proposed development has been conducted in compliance with IAQM's construction guidance.
- 7.29. Construction activities have a medium potential to generate dust and emissions, since the materials used in the construction are mostly concrete, red brick works, metal cladding, micro rib cladding and steel which are prone to generate dust and emissions. The proposed development site has been classified as medium risk during track out and low risk for demolition and earthworks. To address this, a comprehensive package of mitigation measures will be implemented to minimize dust emissions. With these measures in place, any residual effects are anticipated to be 'not significant.'
- 7.30. The IAQM guidance acknowledges that, despite robust dust management plans, it is not always possible to ensure complete effectiveness under all conditions, such as adverse weather. As a result, the local community may occasionally experience short-term annoyance. However, the scale and duration of such occurrences are not expected to be significant enough to alter the conclusion that the overall construction and demolition effects of the proposed development will remain 'not significant.'

Health Impacts

- 7.31. The health risk and impacts of the construction dust with respect to the high, medium and low sensitivity receptors were found to be low, since the annual mean PM₁₀ predicted background concentrations be a maximum of 11.4 µg/m³ in the vicinity of the Proposed Development and <100 high sensitivity receptors were found exposed to these concentrations within 250 m of the application site. Hence, this is categorised as low risk, showing that no further assessment or mitigation measures are required.

Construction Traffic and Plant

- 7.32. As previously stated, there is a medium risk on construction and demolition effects from the proposed development. However, we recommend some best available techniques (BAT) to be adapted during the construction phase, and they are listed below:

- All vehicles should switch off engines when stationary, no idling vehicles;
- Minimise the movement of construction traffic around the site;
- Maximising efficiency (this may include alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing);
- Vehicles should be well maintained and kept in a high standard of working order;
- Avoid the use of diesel or petrol powered generators by using mains electricity or battery powered equipment where possible.

8. OPERATION PHASE TRAFFIC EMISSIONS

- 8.1. The EPUK & IAQM Guidance — 'Planning for Air Quality' (IAQM, 2017) has been used to assess potential traffic impacts associated with the development and this is outlined within the table below.

Indicative criteria requiring an air quality assessment

The Development will	Indicative criteria to proceed to an air quality assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight).	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere
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
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
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.
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
Have an underground car park with extraction system	The ventilation extract for the car park will be within 20m of the relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out)

- 8.2. Traffic data for both the existing scenario and the proposed development will be assessed. If the analysis identifies a significant change in traffic volumes that exceeds the indicative thresholds set out in the EPUK & IAQM guidance document, Planning for Air Quality, an air quality assessment

will be required. If the projected changes remain within the defined thresholds, no further assessment will be necessary. Consequently, mitigation measures are not expected to be necessary.

- 8.3. The development scheme proposes 30 parking spaces, and the increase in traffic flow is not expected to result in an increase of more than 500 AADT for LDVs, which is the criteria for sites located outside AQMA.
- 8.4. HDV movements are not expected to increase and are below the EPUK & IAQM threshold of <100 AADT outside an AQMA.
- 8.5. The proposed development site is not presently inside an AQMA and the vehicle trips are expected to be well below the threshold for a site outside an AQMA proposed by EPUK & IAQM Guidance — 'Planning for Air Quality' (IAQM, 2017) which concludes that a further detailed air quality assessment is not required.

9. OPERATIONAL IMPACTS

Building Emissions

- 9.1. The development places high-quality design at the centre of the site's vision. A landscape-led approach will therefore be adopted to create a cohesive sense of place through careful consideration of building orientation and layout.
- 9.2. Sustainability is embedded in the design from the outset, with the development adopting a fabric-first approach to energy efficiency. Dwellings will be designed to minimise heat loss and reduce energy demand in accordance with, and where feasible exceeding, the requirements of Building Regulations Part L.
- 9.3. The energy strategy will be supported by low-carbon heating technologies, such as air source heat pumps, and the incorporation of photovoltaic panels where appropriate. Building orientation will also be carefully considered to optimise passive solar gain.
- 9.4. In addition to operational energy performance, the development will incorporate carbon-sensitive construction methods through the responsible sourcing of materials, the selection of products with lower embodied carbon where practicable, and the minimisation of construction waste.
- 9.5. Sustainable drainage systems will be integrated to manage surface water effectively, improve water quality and enhance biodiversity, while tree planting and landscape features will contribute to urban cooling and climate resilience.
- 9.6. Provision for electric vehicle charging infrastructure will be incorporated in accordance with current standards, supporting the transition to low-emission transport.
- 9.7. Collectively, these measures will contribute to reducing greenhouse gas emissions and lowering the overall carbon footprint of the development, while avoiding the release of toxic pollutants such as nitrogen oxides, carbon monoxide and other combustion-related emissions, thereby minimising potential adverse impacts on air quality.
- 9.8. The proposed heating systems are not directly associated with nitrogen oxides (NO_x) or particulate emissions and therefore comply with the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) criteria. As such, no specific air quality mitigation measures are required.
- 9.9. Any future installation of plant or equipment with the potential to affect air quality will be controlled through appropriate planning conditions and required to comply with relevant legislation, including the Environmental Permitting Regulations (UK Legislation, 2018).

10. SUSSEX GUIDANCE

Emissions Mitigation Assessment

- 10.1. The development scheme is currently at outline planning application stage. Therefore, not all details are known at this stage to inform a full emissions mitigation assessment in line with the Sussex Guidance requirements (Sussex-Air, 2021).
- 10.2. It is anticipated that a full assessment can be provided at a reserved matters stage secured via appropriate planning conditions.

11. CONCLUSIONS

- 11.1. The baseline air quality and site suitability assessment for the proposed development site have been carried out using the data from DEFRA automatic monitoring site, local council's non-automatic monitoring sites, and the PCM modelled results from the UK Air: Information resource.
- 11.2. The air pollutant concentrations for the proposed development are well below the current legislated AQOs and LVs.
- 11.3. The construction dust assessment concludes that the construction and track-out phases of the proposed development pose a medium risk of dust soiling, whereas the earthworks and demolition phases are assessed as low risk. Potential effects on human health and ecological receptors are rated as low during the construction and track-out phases and negligible during the earthworks and demolition phases. With the implementation of the recommended mitigation measures, the overall impact of construction dust is deemed to be not significant.
- 11.4. The predicted traffic changes arising from the proposed development were found to be compliant with the EPUK and IAQM guidance. Therefore, no further detailed air quality assessment is required.
- 11.5. The operational phase energy strategies and building emissions have been found to be compliant with the EPUK and IAQM criteria.
- 11.6. Overall, the air quality assessment demonstrates that the development site is suitable for the proposed residential use, and the air quality impacts due to the proposed development are considered to be 'not significant' and the proposed scheme therefore meets regulatory standards.

Glossary, References and Appendices

Glossary

AADF	Annual Average Daily Traffic Flow
AADT	Annual Average Daily Traffic
An exceedance	A period of time (defined for each standard) where the concentration is higher than that set out in the Standard.
An objective	The target date on which exceedances of a Standard must not exceed a specified number.
AMCT	Annual Mean Concentration Target
AOV	Automatic Opening Vent
AQAP	Air Quality Action Plan
AQFA	Air Quality Focus Areas
AQG	Air Quality Guidelines
AQMA	Air Quality Management Area
AQN	Air Quality Neutral
AQO's	Air Quality Objectives
Air Quality Standards	Concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment.
AQS	Air Quality Strategy
APS	Air Pollution Services
ASHPs	Air Source Heat Pumps
ASR	Annual Status Report
AURN	Automatic Urban and Rural Network
BAT	Best Available Techniques
BREEAM	Building Research Establishment Environmental Assessment Methodology
COCP	Code of Construction Practice
DEFRA	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EPUK	Environmental Protection UK
EC	European Community
EU	European Union
GWP	Global Warming Potential
HDC	Horsham District Council
HGV	Heavy Goods Vehicle
HDV	Heavy Duty Vehicle

HVAC	Heating, Ventilation, and Air Conditioning
IAQM	Institute of Air Quality Management
IT's	Interim Targets
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
LGV	Light Goods Vehicle
Limit Values (LVs)	Legally binding parameters that must not be exceeded. Limit values are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have more than one limit value covering different endpoints or averaging times.
LNR	Local Nature Reserve
MBT	Mechanical Biological Treatment
NO ₂	Nitrogen dioxide
NO _x	Nitrogen Oxides
NPPF	National Planning Policy Framework
PCM	Pollution Climate Mapping
PPG	Planning Practice Guidance
PM _{2.5}	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter
PM ₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
PRTR	Pollutant Release and Transfer Register
SAC	Special Areas of Conservation
SSSI	Site of Special Scientific Interest
WHO	World Health Organization
µg/m ³	Microgrammes per cubic metre

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