

LAND NORTH OF THE OLD BRICKWORKS, SHOREHAM ROAD

HENFIELD, WEST SUSSEX, BN5 9SE

AIR QUALITY ASSESSMENT

RWDI # 2505151_02 REV 01

November 7, 2024

SUBMITTED TO

DMH Stallard

On Behalf of SABBG Holdings Ltd

Sweeptech House, London Road
Hickstead,
RH17 5LZ
West Sussex

SUBMITTED BY

RWDI

Stefan De Vito
Project Manager
Stefan.DeVito@rwdi.com

37 Frederick Place,
Brighton
BN1 4EA
East Sussex



VERSION HISTORY

DMH Stallard LLP

LAND NORTH OF THE OLD BRICKWORKS, SHOREHAM ROAD AIR QUALITY ASSESSMENT

DOCUMENT REFERENCE: 2505151_02 REV 01

REVIEW AND AUTHORISATION			
Authored By Nalisha Parmar	Position Senior Air Quality Consultant	Signature	Date
Checked By Jorge Gomez Perales	Position Technical Director, Air Quality	Signature	Date
Reviewed By Jorge Gomez Perales	Position Technical Director, Air Quality	Signature	Date
Approved By	Position	Signature	Date

AMENDMENT HISTORY			
Issue	Status	Description	Date
01	Draft	Draft report for client comment	07/11/2024

This report has been prepared using all reasonable skill and care within the resources agreed by the client. No responsibility is accepted for matters outside the terms and scope of the agreement under which this report has been prepared. Similarly no responsibility in any form is accepted for third party use of this report or parts thereof, the contents of which are confidential to the client.



EXECUTIVE SUMMARY

RWDI has prepared an air quality assessment to support the planning application for the proposed development at land north of the Old Brickworks, Shoreham Road, Henfield, West Sussex, BN5 9SE. This report has been prepared to assess the effects associated with the construction and operational phases of the proposal.

The proposed development will incorporate the construction of 60,000 ft² of B8/B2/E(g) industrial and commercial using spaces, landscaping and associated car parking.

The construction phase assessment presented in this report shows that effects are expected to be minimal and not significant providing mitigation measures are in place to control dust and emissions associated with construction activities.

The operational phase assessment was conducted using detailed modelling for vehicle movements associated with the proposed development. The results show that air quality impacts from operational traffic are expected to be of negligible significance on local air quality and the effects are expected to be not significant.

The results of the emissions mitigation assessment show that the five-year air quality damage cost of the development is equal to £18,146. This represents the sum of money to be spent on mitigating vehicle emissions from the proposed development. In order to cover this cost, the current design will incorporate infrastructure for electric vehicle charging points, air source heat pumps and cycling.

The proposed development is considered to comply with relevant national, regional or local planning policy and air quality does not present a constraint to the development proposal.



TABLE OF CONTENTS

1	INTRODUCTION	7
1.1	Project Overview	7
1.2	Report Structure	7
2	SITE DETAILS	8
2.1	Site Description.....	8
2.2	Proposed Development.....	8
2.3	Study Area	8
3	LEGISLATION, POLICY AND GUIDANCE	9
3.1	Introduction.....	9
3.2	Legislation	9
3.3	Policy and Guidance.....	11
3.4	Non-Statutory Guidance	13
4	METHODOLOGY	14
4.1	Assessment Approach.....	14
4.2	Screening Criteria	14
4.3	Construction Dust Screening.....	15
4.4	Construction and Operational Traffic Screening	15
4.5	Operational Energy Plant Screening.....	15
4.6	Dispersion Modelling- Vehicle Emissions.....	15
4.7	Emissions Mitigation Assessment	16
5	BASELINE CONDITIONS	17
5.1	Local Authority	17
5.2	Defra Background Maps.....	18
5.3	Summary of Baseline Conditions.....	19
6	CONSTRUCTION IMPACTS	20
6.1	Construction Dust	20
6.2	Construction Traffic	20
6.3	Magnitude of Dust Emissions	20
6.4	Sensitivity of the Area	21
6.5	Dust Risk.....	22
7	OPERATIONAL IMPACTS	24
7.1	Screening	24
7.2	Operational Traffic Assessment	24
7.3	Operational Onsite Energy Generation Assessment	24
7.4	Receptors	24



7.5 Modelling Results.....27

8 EMISSIONS MITIGATION ASSESSMENT 30

9 MITIGATION AND CONTROL.....31

9.1 Construction31

9.2 Operational 34

10 CONCLUSIONS35

11 REFERENCES36

APPENDIX A: MODEL INPUT

APPENDIX B: WIND ROSE FOR SHOREHAM 2023

APPENDIX C: MODEL VERIFICATION

APPENDIX D: IAQM SIGNIFICANCE CRITERIA

LIST OF TABLES

Table 3.1: Summary of relevant UK air quality objectives for the protection of human health
Table 3.2: PM _{2.5} UK Target Values
Table 5.1: Continuous Monitoring Site Measured Concentrations (µg/m ³)
Table 5.2: Diffusion Tube Monitoring Annual Mean NO ₂ Concentrations (µg/m ³)
Table 5.3: Predicted Defra Background Pollutant Concentrations (µg/m ³)
Table 6.1: Dust Emission Magnitude Summary
Table 6.2: Sensitivity of the Area Summary
Table 6.3: Dust Risk Category Summary
Table 7.1: Assessment Receptors
Table 7.2: Annual Mean NO ₂ Concentrations
Table 7.3: Annual Mean PM ₁₀ Concentrations
Table 7.4: Annual Mean PM _{2.5} Concentrations
Table 8.1: Five-Year Air Quality Damage Cost Calculation
Table 9.1: Recommended Mitigation Measures – Construction Phase
Table A1: Model Input Parameters
Table A2: Modelled Road Links
Table A3: Traffic Data Used in the Assessment
Table C1: Diffusion Tube Data Used for Model Verification
Table C2: Comparison of Monitored and Modelled NO _x and NO ₂ data
Table C3: Comparison of Adjusted Modelled NO _x and NO ₂ data
Table D1: IAQM Significance Criteria

LIST OF FIGURES

Figure 2.1: Proposed Development Location
Figure 6.1: Site Boundary Dust Risk Buffers
Figure 6.2: Trackout Route Dust Risk Buffers
Figure 7.1: Study Area

LIST OF APPENDICES

Appendix A: Model Input
Appendix B: Wind Rose for Shoreham 2023
Appendix C: Model Verification
Appendix D: IAQM Significance Criteria

1 INTRODUCTION

1.1 Project Overview

RWDI was commissioned, in September 2024 by DHM Stallard, on behalf of SABBG Holdings Ltd, to produce an air quality assessment for the proposed development at the land north of the Old Brickworks, Shoreham Road, Henfield, West Sussex, BN5 9SE. The proposed development lies within the jurisdiction of Horsham District Council (HDC).

This assessment has been prepared to determine the likely air quality impacts from the development of the site on existing and introduced receptors, to accompany a planning application.

1.2 Report Structure

Details of the site and the proposed development are presented in the following section of this report. Relevant air quality legislation, policy and guidance are outlined in Section 3 and the assessment methodology is detailed in Section 4. The existing baseline conditions are presented in Section 5. Impacts from construction and operation are assessed in Sections 6 and 7, respectively. The emissions mitigation assessment is summarised in Section 8, mitigation options are presented in Section 9, and the assessment is summarised in Section 10.

2 SITE DETAILS

2.1 Site Description

The proposed development site is located at land north of the Old Brickworks, Shoreham Road, Henfield, West Sussex, BN5 9SE.

The site currently comprises of unoccupied land which lies on a plot of approximately 19,000 m², surrounded by commercial units located to the east and south of the site. There are also scattered residential properties to the north and south.

2.2 Proposed Development

The proposed development includes the construction of 12 units over four warehouses to create approximately 60,000 ft² of B8/B2/E(g) industrial and commercial using spaces. The main road access is expected to be via the southern adjacent site onto south of Shoreham Road. The proposed car parking comprises 99 standard vehicles spaces including electric vehicle (EV) charging points and blue badge users. The development will also have sheltered cycle storage. The site will use air source heat pumps for heating and hot water purposes.

2.3 Study Area

Locations where people or wildlife may be adversely affected by changes in air quality or dust soiling are considered relevant receptors for air quality.

For dust soiling, high-sensitivity receptors may include both residential and ecological receptors, whilst medium to low sensitivity receptors may include amenity areas and workplaces.

A number of receptors are located in the vicinity of the proposed development site, which could potentially be affected by changes in air quality arising from the construction and operation of the development.

No residential properties are located within 20 m of the proposed development, with the nearest residential receptors, however there is one property approximately 30 m northeast of the site boundary. There are a number of commercial units located within close proximity of the site, with one located within 20 m of the southern site boundary.

No ecological receptors have been identified in the vicinity of the development site. Therefore, ecological receptors have been scoped out of this assessment.

3 LEGISLATION, POLICY AND GUIDANCE

3.1 Introduction

Atmospheric pollutants of general concern associated with the impacts of developments on human receptors are nitrogen dioxide (NO₂) and particulate matter (PM).

NO₂ is produced through the combustion of fossil fuels, used for transport and energy supply. Emissions of oxides of nitrogen (NO_x) from exhausts comprise of nitric oxide (NO) and NO₂. NO undergoes oxidation in the atmosphere to form NO₂. High concentrations of NO₂ can cause lung inflammation, shortness of breath and coughing, and reduced immunity to lung infections like bronchitis.

PM can result directly as emissions from local sources (primary), or further afield, often having originated as other pollutants and reformed in the atmosphere (secondary). Primary sources of particulates are of most relevance to this assessment and can include emissions from combustion processes and dust from construction activities. Exposure to high concentrations of particulate matter can cause respiratory and cardiovascular illness and death. PM₁₀ is defined as a mass fraction of airborne particulates with an aerodynamic diameter of 10 microns (µm) or less, whilst PM_{2.5} is defined as a mass fraction of airborne particulates with an aerodynamic diameter of 2.5 microns or less. PM₁₀ and PM_{2.5} are respirable and can be drawn deep into the lungs and cause health problems. The fraction of dust that is larger than 10 µm is filtered by the nose and throat.

3.2 Legislation

The EU Air Quality Directive (Directive 2008/50/EC) [1] came into force in June 2008 and was transposed into legislation in England, Wales, Scotland and Northern Ireland in the Air Quality Standards Regulations 2010 [2], since amended by the Air Quality Standards (Amendment) Regulations 2016 [3]. The Directive introduced legally binding targets for national governments to reduce air pollution to levels at which no or minimal effects on human health are likely to occur. The obligation to meet the requirements of the Directive falls primarily upon the Secretary of State for the Environment in England, and appropriate Ministers in the Devolved Administrations, who are designated as the appropriate "competent authority".

Defra's 'Air Quality Plan for Nitrogen Dioxide (NO₂) in UK' (2017) [4] details the government's plan for reducing roadside NO₂ levels and achieving EU limit values. A supplement to the plan was published in October 2018.

The Air Quality (England) Regulations 2000 [5], as amended [6] define air quality 'objectives' for a number of key pollutants. The air quality objectives are set at a range of different levels and averaging times for different pollutants.

The NO₂ and PM objectives are summarised in Table 3.1 overleaf. The annual mean (long-term) objective applies at locations where individuals might be expected to spend a large majority of their time, for example residential properties. In the case of the hourly mean (short-term), this applies at locations where people might reasonably be expected to spend at least an hour (such as outdoor spaces and leisure areas).

Table 3.1: Summary of Relevant UK Air Quality Objectives for Protection of Human Health

Pollutant	Air Quality Objective		Date to be Achieved by
NO ₂	40 µg/m ³	annual mean	31 December 2005
	200 µg/m ³ not to be exceeded more than 18 hours in a year	hourly mean	31 December 2005
PM ₁₀	50 µg/m ³ not to be exceeded more than 35 times a year	24-hour mean	31 December 2004
	40 µg/m ³	annual mean	31 December 2004
PM _{2.5}	20 µg/m ³	annual mean	1 January 2020
	15% reduction urban background	annual mean	2010-2020

The Environment Act 1995 [7] introduced the requirement for local authority management of air quality. Part IV of the Act details the duties of local authorities in carrying out their local air quality management (LAQM) responsibilities.

The UK government published the Environment Act 2021 [8]. The act makes provision of about targets, plans and policies for improving the natural environmental, and the environmental protection about air quality. The act highlights that the Secretary of State must by regulations set a target value for PM_{2.5} annual mean concentrations in ambient air [9].

A new Air Quality Strategy (AQS) for England has been published in April 2023 [10]. The AQS sets out the actions the government expects local authorities to take in support of achieving government long-term air quality goals, including new PM_{2.5} targets values. as summarised in Table 3.2.

Table 3.2: PM_{2.5} UK Target Values

Pollutant & Metric	Target	Target Year
PM _{2.5} annual mean concentration	Interim target: 12 µg/m ³	2028
	Legally binding target: 10 µg/m ³	2040
PM _{2.5} population exposure	Interim target: 22% reduction in exposure compared to 2018	2028
	Legally binding target: 35% reduction in exposure compared to 2018	2040

The Environmental Protection Act 1990 (EPA) [11] deals with statutory nuisance. Nuisance caused by dust is regulated by the statutory nuisance provisions under Part III and is defined in s.79(1)(d) as: "Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance".

Statutory nuisance is not intended to secure a high level of amenity but rather to act as a basic safeguard on emissions. The perpetrator of any alleged nuisance has a defence of best practicable means (BPM) which provides a basis for balancing the interests of the site and residents.

There are no UK standards or statutory guidance relating to deposited dust and nuisance, although a deposition rate of 200 mg/m²/day is often used as a threshold for potentially significant nuisance effects.

The Clean Air Act 1993 (CAA) [12] details the legislative requirements for the heights of chimneys and flues where the burn rates exceed certain criteria. For appliances fuelled by gaseous matter the relevant criterion value is 366.4kW.

3.3 Policy and Guidance

National Policy and Guidance

The National Planning Policy Framework (NPPF) was first published in 2012 and subsequently updated in December 2023 [13]. Paragraph 192 states:

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

The roles of the planning authority and pollution control authorities are defined in paragraph 194:

"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

The National Planning Practice Guidance (NPPG) [14] provides guiding principles on how planning can take into account of the impact of new development on air quality. It includes guidance on:

- air quality considerations for planning;
- plan-making and air quality;
- air quality and neighbourhood planning;
- available information;

- when air quality considerations could be relevant to development planning;
- specific issues when assessing air quality impacts;
- required detail for air quality assessments; and
- mitigating air quality impacts.

The guidance provides a flow chart detailing the process that should be followed in determining an application. It indicates that an application should proceed to decision with appropriate planning conditions or obligations if the proposed development, with mitigation in place, would not lead to an unacceptable risk from air pollution, prevent sustained compliance with EU limit values or fail to comply with the requirements of the Habitats Regulations [15].

Local Air Quality Policy

Under the Local Development Framework (LDF) strategy, local authorities are required to prepare an overarching Core Strategy document. Horsham District's Planning Framework (excluding South Downs National Park) was adopted in 2015 and covers the period up to 2031 [16].

The new Local Plan covering the period from 2019 to 2036 was submitted for consultation in March 2020 and aims to deliver the social, economic and environmental needs of Horsham District [17]. HDC's new local plan and since been delayed and in December 2023 HDC approved the Horsham District Local Plan for 2023 to 2040 and recommended that it proceeds to the next stage of preparation with the aim to adopt the local plan in 2025.

The new proposed Local Plan is due to supersede Horsham District's 2015 Local Plan upon final publication in May 2025. Spatial Objectives 8 and 9 relating to air quality within the proposed Local Plan aim to:

"Identify and preserve the unique landscape character and the contribution that this makes to the setting of rural villages and towns and ensure that new development minimises the impact on the countryside"; and

"safeguard and enhance the environmental quality of the District, ensuring that development brings forward environmental net gains including biodiversity enhancements, and minimises the impact on environmental quality including air, soil, water quality and the risk of flooding".

Policy 26 – Air Quality, of the new proposed Local Plan, states:

"The Council recognises the importance of the management of air quality. Taking into account any relevant Planning Guidance Documents, proposals will be required to:

- 1. Take account of The Air Quality and Emissions Mitigation Guidance for Sussex (2019), or any future updates. Major development proposals and proposals within an Air Quality Management Area (AQMA), or in relevant proximity to an AQMA, must be accompanied by an Air Quality Impact Assessment and an Emissions Mitigation Assessment;*
- 2. Contribute to the implementation of local Air Quality Action Plans, and not conflict with the set objectives;*
- 3. Minimise traffic generation and congestion through access to sustainable transport modes, maximising the provision for cycling and pedestrian facilities;*
- 4. Encourage the use of cleaner transport fuels, including through the provision of electric car charging points;*

5. *Mitigate the impact on the amenities of users of the site and surrounding land to an appropriate level, where development creates or results in pollution including particulates, dust, smoke, pollutant gases or odour; and*
6. *Ensure that the cumulative impact of all relevant committed developments is appropriately assessed."*

Under the local air quality management regime introduced by the Environment Act 1995 and subsequent regulations, HDC is required to review and assess its air quality at regular intervals. As detailed in the 2024 Air Quality Annual Status Report (ASR) [18], there are currently two Air Quality Management Areas (AQMA) declared in the district in the village of Cowfold (Cowfold AQMA) and the town center of Storrington (Storrington AQMA), in 2011 and 2010, respectively. Both declarations were made on the basis that the annual mean nitrogen dioxide (NO₂) concentrations would not meet the national air quality objective (AQO). Air Quality Action Plans (AQAP) were prepared for both.

The latest revision of the West Sussex County Council's (WSCC) AQAP: '*Breathing Better*' published in January 2020 [19] and updated in September 2023 [20] provides measures for improving air quality in the borough. This document contains proposed actions such as: increasing the uptake of low emission and electric vehicles and the introduction of electric vehicle charging points, identifying and implementing sustainable transport infrastructure and traffic management schemes, exploring behaviour change initiatives and engaging residents and businesses in activities that will benefit local air quality.

WDC, along with several other Sussex local authorities (the 'Sussex Air Quality Partnership'), developed the 'Air quality and emissions mitigation guidance for Sussex' [21] for the assessment of developments. This provides checklists to determine whether a development requires consideration with regard to air quality, and whether a full air quality assessment is required, or just an emissions mitigation assessment. An emissions mitigation assessment involves establishing the likely emissions from a development and calculating an appropriate monetary value to be applied to air quality mitigation measures within the development.

3.4 Non-Statutory Guidance

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have produced a document entitled: *Land-Use Planning & Development Control: Planning for Air Quality* [22] that provides guidance on how to ensure that air quality is properly accounted for in the development control process. This guidance provides advice on describing air quality impacts and assessing their significance.

The Institute of Air Quality Management (IAQM) has published specific '*Guidance on the assessment of dust from demolition and construction*' [23] to provide guidance and good-practice approaches on the assessment and mitigation of dust impacts from demolition and construction site activities. The impacts naturally depend on any incorporated mitigation and the emphasis in these guidelines is on classifying the risk of dust impacts from a site as a basis for the identification of mitigation that is commensurate with such risk.

4 METHODOLOGY

4.1 Assessment Approach

This air quality assessment has been produced using the information available and procedures as follows:

- I. a review of HDC's 2024 ASR [18] and Defra's background maps [24] to establish baseline air quality and identify the main pollution sources in the area and compare with the UK air quality objectives;
- II. consider the local environment to identify potentially sensitive receptors, both existing and proposed, that could be affected by changes in air quality as a result of the construction and operation of the proposed development;
- III. assess qualitatively the potential dust and air quality impacts of the construction activities and control measures considered necessary during these activities, in line with IAQM guidance [23];
- IV. screen the requirement to undertake detailed assessment of operational traffic and energy plant;
- V. dispersion modelling using ADMS-Roads to predict the likely concentrations of NO₂, PM₁₀ and PM_{2.5} at the development site and nearby sensitive receptors in line with Defra LAQM-TG22 guidance [25];
- VI. comparison of the predicted NO₂, PM₁₀ and PM_{2.5} concentrations with the UK air quality objectives and the EPUK/IAQM significance criteria [22];
- VII. calculate the estimated damage cost caused by NO_x and PM_{2.5} from the proposed development in accordance with the 'Air quality and emissions mitigation guidance for Sussex' [21]; and
- VIII. identify and present relevant mitigation options recommended to reduce the potential impacts from the proposed development and, if necessary, to meet relevant planning and environmental requirements; and
- IX. assumptions on construction and operational phases based on project experience and discussions with the design team.

4.2 Screening Criteria

The assessment follows the procedure as defined in the IAQM/EPUK guidance document for 'Land-use Planning & Development Control: Planning for Air Quality'.

The IAQM/EPUK guidance provides criteria for establishing whether a development will require an air quality assessment. Stage 1 criteria are designed to screen out smaller developments and developments where air quality impacts can be considered to have insignificant effects. The criteria are set out in a two-stage approach:

In order to meet the criteria in Stage 1, the development must have:

- 10 or more residential units or a site area of more than 0.5 ha; or
- more than 1,000 m² of floor space for all other uses or a site area greater than 1 ha.

This must be combined with any of the following:

- more than 10 parking spaces within the development; or
- the development has a centralised energy facility or combustion process.

4.3 Construction Dust Screening

The IAQM document 'Guidance on the assessment of dust from demolition and construction', provides criteria for establishing whether a development will require a construction dust assessment. The guidance indicates that an assessment is required if there is a human receptor within 250 m of the boundary of the site or 50 m of the trackout route (up to 250 m from site entrance) or if there is an ecological receptor within 50 m of the boundary of the site or trackout routes (up to 250 m from site entrance).

4.4 Construction and Operational Traffic Screening

The EPUK/IAQM guidance provides criteria for establishing whether a development will require a construction or operational traffic detailed assessment. The guidance indicates that an assessment of traffic emissions is only likely to be required for sites that will generate an additional annual average daily traffic (AADT) of greater than 500 LDVs and 100 outside an AQMA.

4.5 Operational Energy Plant Screening

The EPUK/IAQM guidance for new development provides criteria for establishing whether a development will require an energy plant assessment during the operational phase. The guidance indicates that, typically a detailed modelling assessment of the proposed onsite energy plant is unlikely to be required where the single or combined NO_x emission rate less than 5 mg/s¹. This is also dependent on the location and height of associated flues.

4.6 Dispersion Modelling- Vehicle Emissions

The dispersion model ADMS-Roads (version 5.0.1.3) was used to predict NO₂, PM₁₀ and PM_{2.5} concentrations at existing and proposed receptors within the site for the proposed following scenarios:

- 2023, baseline and verification year;
- 2025, future baseline without proposed development in operation; and
- 2025, future baseline with proposed development in operation.

The model set-up and key model input parameters are presented in Appendix A.

Traffic data for all modelling scenarios has been provided by the Transport Team, Motion Consultants Limited. The roads modelled were Shoreham Road (A2037), High Street (A281) and Brighton Road (A281). A diagram of the modelling extent is detailed in Figure 7.1, Section 7.4.

Road link emissions were calculated using the Defra's emission factors (EFT version 12.1) [26] emissions dataset for 2023, and 2025. Defra background maps (base year 2018) for 2023, and 2025, and Defra's latest NO_x:NO₂ calculator (version 8.1) [27] were used for this assessment.

¹ As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NO_x gas boiler or a 30 kW CHP unit operating at <95mg/Nm³.

Meteorological data from Shoreham Meteorological Station for the year 2023 was used in all modelling scenarios. A wind rose for this station is depicted in Appendix B.

Model verification for a base year of 2023 was undertaken in line with LAQM-TG-22 [25]. PM₁₀ and PM_{2.5} contributions from major roads were predicted using the model and calculated using the same derived verification adjustment factor for NO₂ concentrations. The calculation of the model verification is presented in Appendix C.

4.7 Emissions Mitigation Assessment

Sussex Air Quality Partnership's guidance provides a checklist for establishing whether a development will require an emissions mitigation assessment. The guidance indicates that an assessment is required if the proposed development is categorised as a 'major' development.



5 BASELINE CONDITIONS

5.1 Local Authority

HDC conducts air quality monitoring at various locations within the borough as part of its LAQM duties. Two AQMAs were declared in the district in the village of Cowfold and town center of Storrington, in 2011 and 2010 respectively, on the basis that the annual mean nitrogen dioxide (NO₂) concentrations would not meet the national air quality objective (AQO). The proposed development is not located within or adjacent to an AQMA.

It can be seen from the 2024 HDC ASR that from 2019 to 2023, across the continuous and non-automatic monitoring stations within the district, there has been an overall decreasing trend in NO₂ concentrations. Across continuous monitoring stations, PM₁₀ and PM_{2.5} concentrations have remained low and relatively stable.

Automatic Monitoring

The nearest NO₂ roadside continuous monitoring site is located approximately 8 km north of the development, at Cowfold. This monitoring location is situated 6.5 m from the kerb of a roundabout which experiences high levels of traffic.

This monitoring location is not within close proximity of the proposed development site. It is located at a busy roundabout within Cowfold where NO₂ concentrations are expected to be higher than at the proposed development site, which is situated in a rural industrial setting.

Table 5.1 shows the monitor remained well within the annual mean NO₂ AQO (annual mean of 40 µg/m³) in all reported years. There were no exceedances of the NO₂ one-hour mean objective (no more than 18 exceedances of the one-hour mean of 200 µg/m³ per calendar year) in all reported years.

The nearest PM₁₀ roadside continuous monitoring site is located approximately 12.7 km west of the development, at Storrington. This monitoring location is situated 4.6 m from the kerb of Washington Road (A283) which experiences high levels of traffic. This monitoring station in Storrington is surrounded by residential estates, where PM₁₀ concentrations are expected to be higher than at the proposed development site, which is situated in a rural industrial setting.

Table 5.1 shows that measured PM₁₀ concentrations remained well within the annual AQO at the monitoring location in all reported years. There were no exceedances of the PM₁₀ 24-hour mean objective (no more than 35 exceedances of the 24-hour mean of 50 µg/m³ per calendar year) in all reported years.

Table 5.1: HDC Continuous Monitoring Site NO₂ and PM₁₀ Concentrations (µg/m³)

Site ID	Distance from site (km)	Type	Pollutant	2019	2020	2021	2022	2023
HO5 – Cowfold	8.0	Roadside	NO ₂	23.6 (0)	23.4 (0)	20.3 (0)	21.0 (0)	24.6 (0)

Site ID	Distance from site (km)	Type	Pollutant	2019	2020	2021	2022	2023
HO4 – Storrington (AURN)	12.7	Roadside	PM ₁₀	22.0 (0)	17.4 (5)	20.1 (0)	17.6 (0)	17.4 (0)

Note: Number of exceedances of the hourly mean NO₂ AQOs are presented in brackets.

Diffusion Tube Sites

HDC conducts NO₂ monitoring using passive diffusion tubes at a number of locations within the district. The nearest long-term roadside diffusion tube site is Henfield (1n) located 1.3 km to the north of the proposed development site. This diffusion tube is located 2 m from the roadside of the High Street, where NO₂ concentrations are expected to be higher than at the proposed development site, which is situated in a rural industrial setting.

NO₂ monitoring data, between 2019 and 2023, is presented in Table 5.3, showing that all reported roadside remained within the NO₂ annual mean AQO.

The local authority guidance LAQM-TG22 states that when the annual mean NO₂ concentration is below 60 µg/m³, the short term (one-hour) objective for NO₂ is unlikely to be exceeded. Annual mean NO₂ concentrations presented in Table 5.2 have been below 60 µg/m³ for all reported years.

Table 5.2: Diffusion tube monitoring Annual Mean NO₂ concentrations (µg/m³)

Description	Distance from site (km)	Type	2019	2020	2021	2022	2023
2 – Henfield 1n	1.3	Roadside	22.2	19.9	20.9	18.2	18.2

Notes: Exceedances of the annual mean NO₂ AQO are highlighted in **bold**.

5.2 Defra Background Maps

Defra predicted background pollutant concentrations are available for 1 km² grid squares across the UK. Concentrations of NO₂, PM₁₀ and PM_{2.5} are summarised in Table 5.3 for the grid square centred on 521500, 114500, which is the closest representative to the proposed development site. NO₂, PM₁₀ and PM_{2.5} background concentrations are well within the AQOs in 2023 (baseline year), 2025 (proposed opening year).

Table 5.3: PREDICTED DEFRA BACKGROUND POLLUTANT CONCENTRATIONS ($\mu\text{g}/\text{m}^3$)

Pollutant	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)	
	2023	2025
NO ₂	7.4	6.8
PM ₁₀	12.9	12.7
PM _{2.5}	8.3	8.0

5.3 Summary of Baseline Conditions

The proposed development site is located at land adjacent to A2037, in a rural semi-industrial setting with open land surroundings. The nearest urban area is a village titled Henfield located to the north of the site.

Automatic continuous monitoring data from the nearest roadside location to the proposed development remained well within the annual mean AQO between 2019 and 2023 for NO₂ and PM₁₀. There have been no exceedances of the hourly NO₂ AQO or the 24-hour PM₁₀ AQO.

Annual mean NO₂ concentrations measured at the nearest long-term passive roadside diffusion tube monitoring location remained within the AQO in all reported years, with annual mean NO₂ concentrations decreasing from 2019 to 2023 at the site.

The hourly mean NO₂ objective is unlikely to be exceeded at the development site since monitoring in the area is well below 60 $\mu\text{g}/\text{m}^3$.

All monitoring stations detailed above are not located within close proximity of the proposed development site and within urban areas that are not expected to be representative of the site area.

Defra background annual mean pollutant concentrations predict that NO₂, PM₁₀ and PM_{2.5} currently meet the AQO and are expected to decline further in future years. It is expected that these concentrations are the most indicative of the proposed development site.

Overall, baseline data, show that AQOs are currently being met at the proposed development site and are expected to continue to do so.

6 CONSTRUCTION IMPACTS

6.1 Construction Dust

In line with IAQM guidance an assessment of construction dust is required as there are human receptors within 250 m of the site boundary and 50 m of the construction vehicle route (up to 250 m from site entrance). There are no relevant ecological receptors within 50 m of the site or 50 m of the construction vehicle route (up to 250 m from site entrance) and on this basis ecological receptors are not considered further in this assessment.

The assessment follows the IAQM guidance and has been used to identify appropriate mitigation measures proportionate to the level of risk, to reduce the effects such that they are not significant.

The construction phase assessment of human health and dust soiling is reported in this Section.

6.2 Construction Traffic

There are likely to be less than 50 no. construction heavy duty vehicle (HDV) movements to and from the site per day during the construction period. Therefore, the additional AADT would be below the EPUK/IAQM screening criterion of 100 HGVs movements outside an AQMA. Impacts from construction traffic will therefore be negligible and are not considered further in this assessment.

6.3 Magnitude of Dust Emissions

The dust emissions magnitude, area sensitivity and dust risk category were established in accordance with the IAQM guidance [23].

Demolition

The existing site is a vacant parcel of land with no structures present. Therefore, no demolition works will take place and has been screened out of this assessment

Earthworks

The total site area to be excavated is expected to be between 18,000 m² and 110,000 m² with a soil type formed of Weald Clay Formation (mudstone) [28] with a moderate to high potential for dust release. It is estimated there will be less than 10 heavy earth-moving vehicles on site at one time and formation of bunds up to 6 m in height. The site is considered to have a 'Medium' dust emission magnitude for earthworks.

Construction

The total building volume to be constructed is expected to be between 12,000 m³ and 75,000 m³. Building materials will primarily consist of brickwork, concrete and timber. It is unknown if concrete batching and/or sandblasting will take place at this stage of the application, however, is not anticipated, and therefore has been excluded from this assessment. The site is considered to have a 'Medium' dust emission magnitude for construction.

Trackout

The peak number of heavy-duty vehicle (HDV) outward movements per day is expected to be less than 50. The haul route is yet to be confirmed, however is expected to exceed 100 m. The haul road will consist of mudstone from the underlying Weald Clay Formation. The site is considered to have a 'Medium' dust emission magnitude for trackout.

The dust emission magnitudes are summarised overleaf in Table 6.1.

Table 6.1: Dust Emission Magnitude Summary

Activity	Dust Emission Magnitude
Earthworks	Medium
Construction	Medium
Trackout	Medium

6.4 Sensitivity of the Area

There are no high sensitivity receptors within 20 m of the site boundary. There are less than 10 receptors with a high sensitivity to dust soiling effects and human health impacts within 20 m of the trackout route.

There are less than 10 medium sensitivity receptors with a medium sensitivity to dust soiling effects and human health impacts within 20 m of the site boundary and trackout route.

There are less than 10 low sensitivity receptors with a low sensitivity to dust soiling effects and human health impacts within 20 m of the site boundary and trackout route.

Details of receptors within the dust risk areas of the site boundary and trackout route are illustrated in Figures 6.1 and 6.2, respectively.

The sensitivity of the area to dust soiling is defined as 'Medium' for earthworks, construction and trackout activities, due to the number and proximity of sensitive receptors.

The sensitivity of the area to human health impacts is defined as 'Low' for the earthworks, construction and trackout activities, due to the number and proximity of sensitive receptors and a predicted background annual mean PM₁₀ concentration (see Table 5.2) of less than 24 µg/m³ in the vicinity of the site.

The sensitivity of the area is summarised in Table 6.2.

Table 6.2: Sensitivity of the area Summary

Sensitivity of the Area	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium
Human Health	Low	Low	Low

6.5 Dust Risk

The likely risk of dust effects, based on the contents of Tables 6.1 and 6.2, at nearby sensitive receptors without mitigation in place is summarised in Table 6.3. There is a 'Medium' risk from earthworks, construction and trackout activities causing dust soiling effects at local receptors. There is a 'Low' risk of health effects from earthworks, construction and trackout activities.

Table 6.3: Dust Risk Category Summary

Summary	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk

Under best-practice guidance, the proposed development constitutes a 'Medium' risk for dust during the construction phase. Based on the results of the dust risk assessment, appropriate best-practice construction dust mitigation measures commensurate to the level of risk have been identified in accordance with the IAQM guidance and are presented in Section 9.

With appropriate mitigation in place, any dust effects can be minimised, and residual dust effects can be considered to be not significant.

Figure 6.1 Site Boundary Dust Risk Buffer

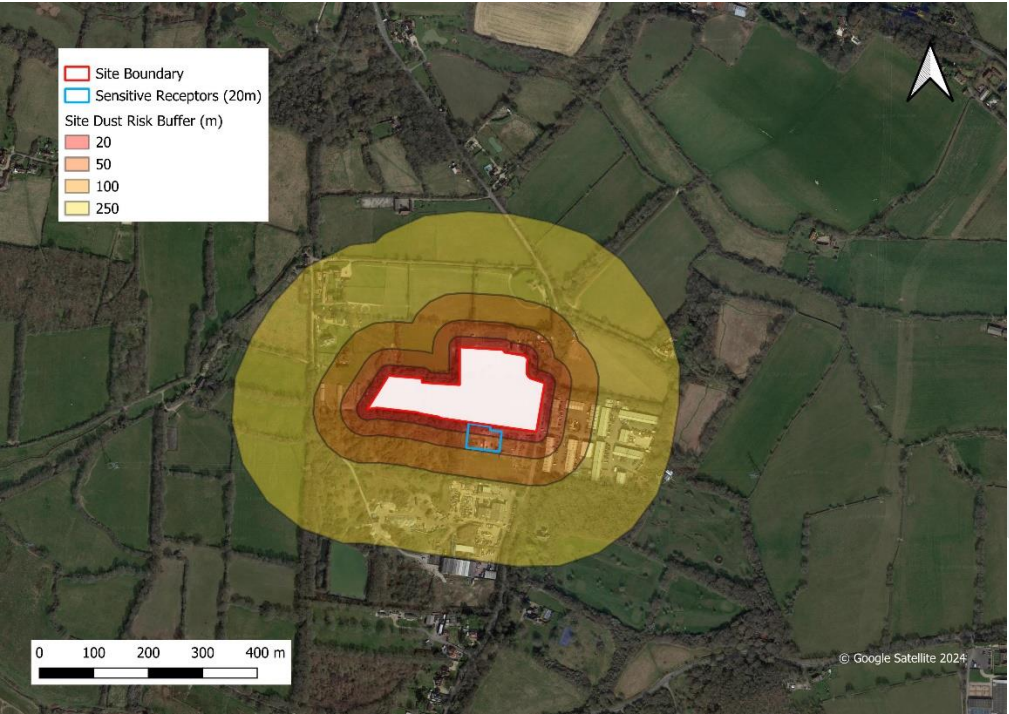
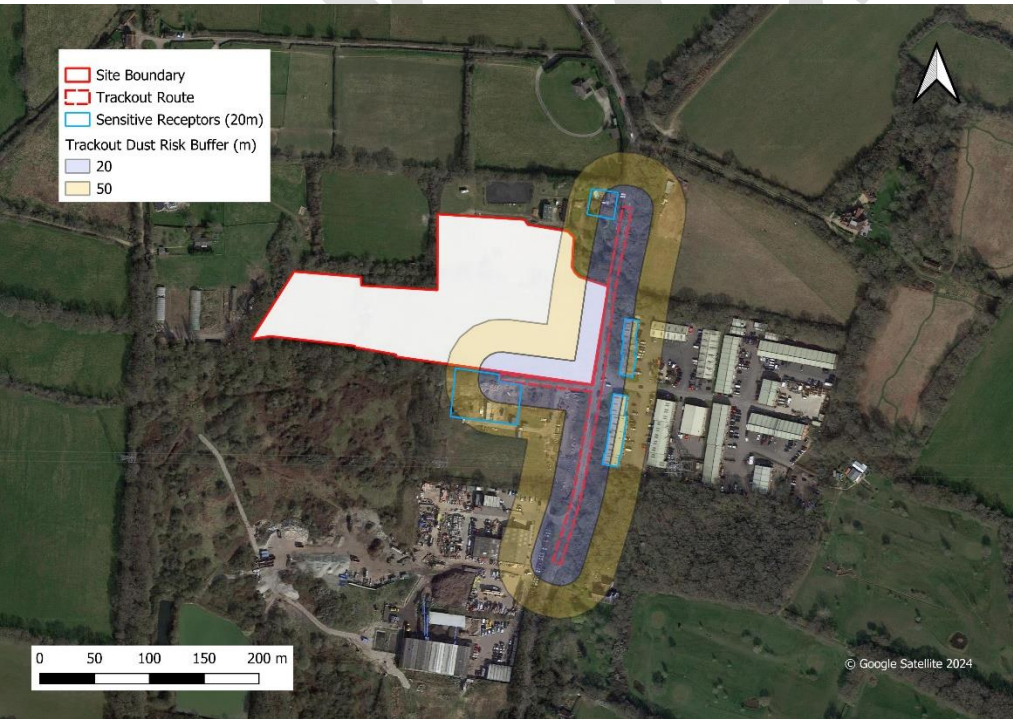


Figure 6.2 Trackout Route Dust Risk Buffer



7 OPERATIONAL IMPACTS

7.1 Screening

The proposed development includes the construction of approximately 60,000 ft² of industrial using floor space with 99 car parking spaces. The proposed development will use air source heat pumps for heating and hot water onsite. The assessment exceeds the stage 1 screening criteria outlined in Section 4.2, and therefore further assessment has been taken into consideration below.

7.2 Operational Traffic Assessment

Traffic data provided by the transport consultant, Motion Consultants Limited indicate that the proposed development will result in approximately 400 annual average daily traffic (AADT) flows across a typical day during the operation period in 2025. Although, the proposed development does not exceed the EPUK/IAQM criteria, detailed in Section 7.4, it is near the threshold and therefore, a detailed assessment of operational traffic emissions is required as the additional AADT during the operational period.

7.3 Operational Onsite Energy Generation Assessment

The proposed development will use air source heat pumps for heating and hot water onsite. Therefore, emissions associated with onsite energy generation have been screened out of any further assessment.

7.4 Receptors

Modelled receptors are listed in Table 7.1 illustrated in Figure 7.1.

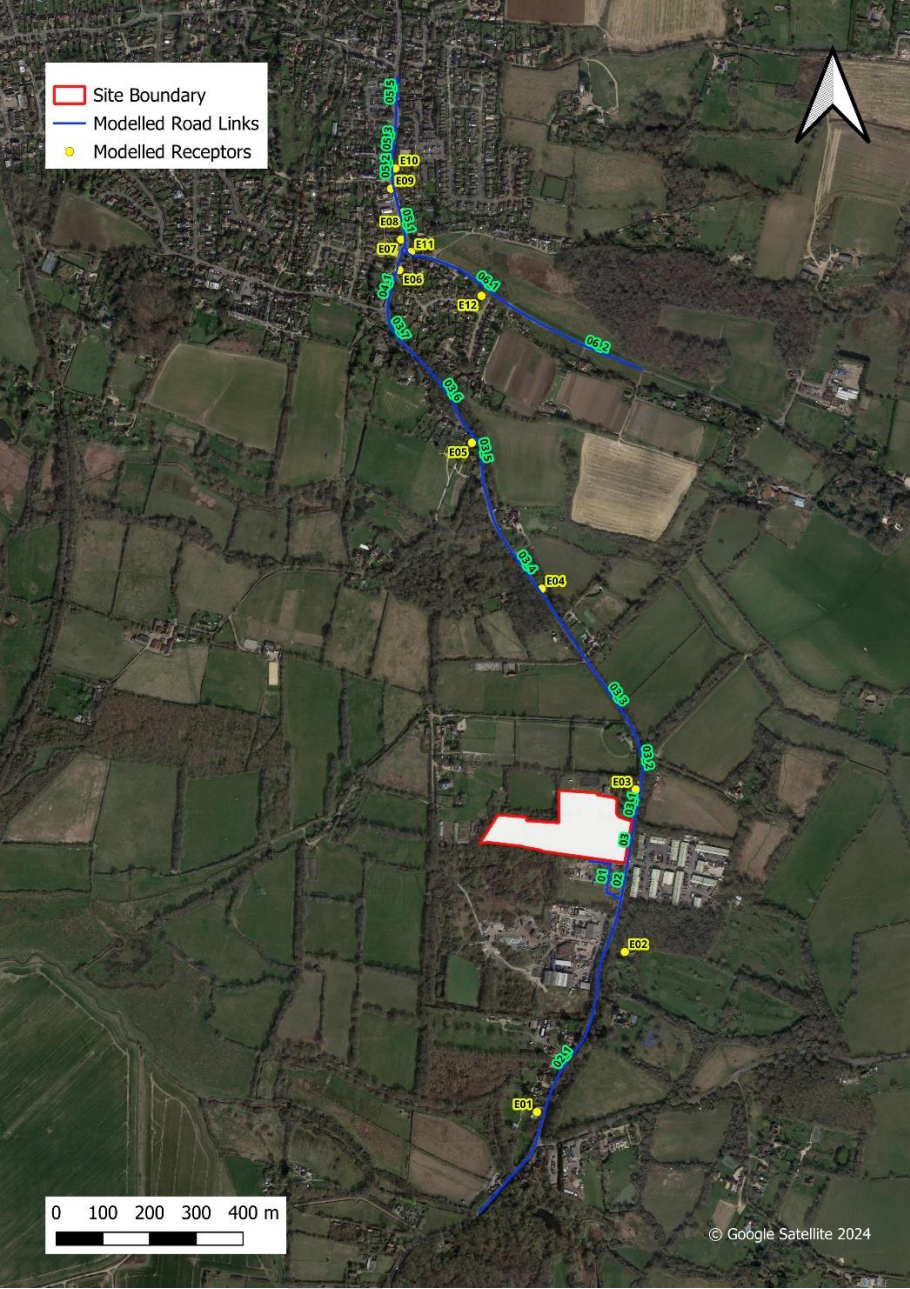
Modelled receptors include those existing receptors along the local affected road network. The receptors chosen include locations that are representative of likely worst-case exposure. Several receptors are modelled at the first-floor level, where sensitive receptors are above commercial buildings along the high street.



Table 7.1: Assessment receptors

Receptor ID	Description	Coordinates		Height (m)
		X	Y	
E01	Sylvan Mead	521808	113906	1.5
E02	Paddock Wood	521997	114249	1.5
E03	South Ground	522020	114596	1.5
E04	Oak Cottage	521819	115026	1.5
E05	Barrow Hill Farm	521670	115339	1.5
E06	Golden Square	521514	115708	1.5
E07	The Green	521518	115774	1.5
E08	Rus House	521523	115832	1.5
E09	Henfield Antiques & Home	521496	115883	4.5
E10	Henfield Pharmacy	521506	115926	4.5
E11	Challens	521539	115747	1.5
E12	25 Mill Drive	521690	115653	1.5

Figure 7.1: Study Area



7.5 Modelling Results

The long-term modelled annual mean NO₂, PM₁₀ and PM_{2.5} concentrations for all scenarios are presented in Tables 7.2 to Table 7.4. Percentage changes relative to the AQO, between the 2025 with and without development scenarios, were assessed against the EPUK/IAQM impact descriptor matrix as presented in Appendix D.

NO₂

The results presented Table 7.2 indicate that modelled NO₂ concentrations at all receptors are within the annual objective of 40 µg/m³ for all scenarios.

The percentage of change in NO₂ contributions from the proposed development ranges between 0.1 and 0.3% at the assessed receptors in 2025. Predicted impacts using IAQM/EPUK criteria are 'Negligible' at all receptors and effects are not significant.

LAQM-TG22 states that, when the annual mean NO₂ concentrations are less than 60 µg/m³, the short-term (one-hour) objective for NO₂, is unlikely to be exceeded. Therefore, all assessment receptors are expected to meet the short-term objective.

Table 7.2: Annual Mean NO₂ Concentrations

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			% Change Relative to AQAL (40 µg/m ³)	Impact Descriptor
	2023 Baseline	2025 Without Development	2025 With Development		
E01	8.48	8.34	8.37	0.1	Negligible
E02	8.05	7.93	7.96	0.1	Negligible
E03	9.06	8.85	8.90	0.1	Negligible
E04	9.75	9.39	9.47	0.2	Negligible
E05	9.09	8.84	8.89	0.1	Negligible
E06	11.56	10.85	10.97	0.3	Negligible
E07	11.05	10.44	10.50	0.2	Negligible
E08	11.89	11.14	11.21	0.2	Negligible
E09	8.84	8.64	8.66	0.0	Negligible
E10	9.08	8.83	8.85	0.0	Negligible
E11	14.02	12.74	12.87	0.3	Negligible
E12	8.90	8.70	8.72	0.1	Negligible

PM₁₀ and PM_{2.5}

Table 7.3 and Table 7.4 indicate that, at all assessed receptors, PM₁₀ and PM_{2.5} concentrations are expected to be well within the air quality objectives for all scenarios.

The maximum percentage change in PM₁₀ contribution from the proposed development is 0.1% at the assessed receptors in 2025. Predicted impacts using IAQM/EPUK criteria are 'Negligible' at all receptors and effects are not significant in all scenarios.

Annual mean PM₁₀ concentrations range from 12.6 µg/m³ to 14.3 µg/m³ over the scenarios modelled. Based on these figures, the 24-hour mean PM₁₀ AQO is unlikely to be exceeded for any scenario.

The maximum percentage change in PM_{2.5} contribution from the proposed development is less than 0.2% at the assessed receptors in 2025. Predicted impacts using IAQM/EPUK criteria are 'Negligible' at all receptors and effects are not significant in all scenarios.

Table 7.3: Annual Mean PM₁₀ Concentrations

Receptor ID	Annual Mean PM ₁₀ Concentration (µg/m ³)			% Change Relative to AQAL (40 µg/m ³)	Impact Descriptor
	2023 Baseline	2025 Without Development	2025 With Development		
E01	12.91	12.57	12.57	0.0	Negligible
E02	13.08	12.74	12.75	0.0	Negligible
E03	13.02	12.68	12.70	0.0	Negligible
E04	13.13	13.32	13.34	0.1	Negligible
E05	12.98	13.16	13.18	0.0	Negligible
E06	13.61	13.80	13.84	0.1	Negligible
E07	13.38	13.57	13.59	0.0	Negligible
E08	13.66	13.86	13.88	0.1	Negligible
E09	12.88	13.06	13.06	0.0	Negligible
E10	13.04	12.70	12.70	0.0	Negligible
E11	14.29	13.97	14.00	0.1	Negligible
E12	12.98	12.64	12.64	0.0	Negligible



Table 7.4: Annual Mean PM_{2.5} Concentrations

Receptor ID	Annual Mean PM _{2.5} Concentration (µg/m ³)			% Change Relative to AQUAL (12 µg/m ³)	Impact Descriptor
	2023 Baseline	2025 Without Development	2025 With Development		
E01	8.46	8.18	8.18	0.0	Negligible
E02	8.41	8.12	8.13	0.0	Negligible
E03	8.39	8.10	8.11	0.1	Negligible
E04	8.92	8.64	8.65	0.1	Negligible
E05	8.83	8.55	8.56	0.1	Negligible
E06	9.16	8.88	8.91	0.2	Negligible
E07	9.04	8.76	8.77	0.1	Negligible
E08	9.19	8.91	8.92	0.1	Negligible
E09	8.77	8.49	8.49	0.0	Negligible
E10	8.53	8.25	8.25	0.0	Negligible
E11	9.05	8.77	8.79	0.2	Negligible
E12	8.36	8.08	8.08	0.0	Negligible

8 EMISSIONS MITIGATION ASSESSMENT

In line with Sussex Air Quality Partnership's guidance [21], emissions were calculated using Defra's EFT [26] for the trips to be generated by the proposed development, and the five-year 'damage cost value' was calculated using Defra's latest Damage Cost Appraisal Toolkit [29]. NO_x and PM_{2.5} have been assessed in line with the Sussex guidance.

Emission Factor Toolkit Input

The trip rate (vehicle trips per day) for the development was provided by Motion Consultants Limited, as described in Section 7.2 above. The selected area is 'England (not London)' and the selected road type is 'Road Transport Urban Small'. Inputs of speed and link length are selected as per the Sussex guidance.

Damage Cost Appraisal Toolkit Input

The length of the appraisal period is five years, starting in 2025 and ending in 2029. The selected pollutant sector is 'Road Transport Urban Small' for both NO_x and PM_{2.5}. The central present value outputs for both pollutants are presented for the appraisal period and are added together to calculate the total five-year damage cost value is presented.

Damage Cost

The five-year air quality damage cost of the development was calculated to be £18,146. The calculation of the five-year damage cost is presented below in Table 8.1.

The five-year damage cost represents the minimum sum of money that must be spent on the implementation of practical mitigation measures to aid in off-setting adverse air quality impacts from the development, in line with the Sussex guidance.

Table 8.1: Five-Year Air Quality Damage Cost Calculation

Trip Rate for Development (vehicle trips per day)		400	
Pollutant		Annual Emissions (tonnes/year)	
		NO _x	PM _{2.5}
Emissions (tonnes/annum)	2025	0.3110	0.0334
	2026	0.2735	0.0330
	2027	0.2403	0.0327
	2028	0.2102	0.0324
	2029	0.1833	0.0322
2023 IGCB Damage Cost Valuations (£/tonne of emissions)		7,545	52,114
Five-year (Central Present Value) Damage Cost (£)		9,428	8,718
Five-year Damage Cost NO _x + PM _{2.5} (£)		18,146	

9 MITIGATION AND CONTROL

9.1 Construction

The construction activities associated with the proposed development are predicted to have, at worst, a 'Medium' risk for dust soiling and a 'Low' risk for health effects.

Impacts associated with the proposed development are likely to be in the form of dust generated primarily during construction phase activities. The use of appropriate mitigation measures throughout the construction phase will ensure that impacts are minimised or removed.

Based on the results of the dust risk assessment, it is recommended that the following general best-practice measures (taken from IAQM guidance) be adopted.

Table 9.1: Recommended Mitigation Measures- Construction Phase

Management Category	Mitigation Measure
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundaries. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM ₁₀ continuous monitoring and/or visual inspections.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
	Make the complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.

Management Category	Mitigation Measure
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 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.
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
	Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.
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.
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
	Avoid site runoff of water or mud.
	Keep site fencing, barriers and scaffolding clean using wet methods.
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
	Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle / machinery and sustainable travel	Ensure all on-road vehicles comply with the relevant Emission requirements and NRMM standards, where applicable.
	Ensure all vehicles switch off engines when stationary - no idling vehicles.
	Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.

Management Category	Mitigation Measure
	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.
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
	Use enclosed chutes and conveyors and covered skips.
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste Management	Avoid bonfires and burning of waste materials.
Measures specific to Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. (Desirable)
	Use Hessian, mulches or trackifiers 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)
Measures specific to Construction	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.
	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)

Management Category	Mitigation Measure
	For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. (Desirable)
Measures specific to Trackout	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
	Avoid dry sweeping of large areas.
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
	Record all inspections of haul routes and any subsequent action in a site logbook.
	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
	Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
	Access gates to be located at least 10 m from receptors where possible.

9.2 Operational

By 2025, the results show that NO₂, PM₁₀ and PM_{2.5} annual mean concentrations are expected to meet the AQOs within the proposed development.

The current proposal at the development includes the provision of 35 electric vehicle charging points, the usage of ASHP for means of heating and hot water, and bicycle parking facilities consisting of 52 sheltered storage spaces. This infrastructure will contribute to the cost presented in Section 8 of this report.

Based on this information, no further mitigation measures are required.

10 CONCLUSIONS

An assessment of the air quality impacts associated with the construction and operational phases of the proposed development is presented in this report.

The baseline assessment indicates that NO₂, PM₁₀ and PM_{2.5} AQOs are currently being met in the area around the development site and are expected to continue to be met.

The results of the dust risk assessment indicate that construction activities, at worst, have a medium risk of dust soiling and a low risk of health effects from PM₁₀ at nearby receptors without mitigation. These impacts can be minimised through the implementation of appropriate mitigation measures. These have been identified in Section 9 of this report. With mitigation in place, residual dust effects from construction will be minimal and are considered to be not significant.

Results from the detailed assessment indicate that NO₂, PM₁₀ and PM_{2.5} impacts from operational traffic will result in negligible impacts on local air quality and the effects will therefore be not significant.

There will be no impacts on local air quality from on-site energy plant as air source heat pumps are proposed for heating and hot water provisions across the site during the operational phase.

The proposed development is considered to comply with relevant national, regional and local planning policy and air quality does not present a constraint to the development proposals.

11 REFERENCES

1. Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe. Official Journal of the European Union. Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. 11.6.2008.
2. SI 2010 No. 1001. The Air Quality Standards (England) Regulations 2010. HMSO.
3. SI 2016 No. 1184. The Air Quality Standards (Amendment) Regulations 2016. HMSO.
4. Defra. 2017. Air Quality Plan for Nitrogen Dioxide (NO₂) in UK (2017). [online] <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017#history>.
5. SI 2000 No. 928. The Air Quality Regulations 2000. HMSO.
6. SI 2002 No. 3043. The Air Quality (England) (Amendment) Regulations 2002. HMSO.
7. Office of the Deputy Prime Minister. 1995. The Environment Act.
8. Office of the Deputy Prime Minister (2021). The Environment Act 2021. Available at <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>.
9. Office of the Deputy Prime Minister (2023). The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. Available at <https://www.legislation.gov.uk/uksi/2023/96/introduction/made>.
10. Defra. 2023. Air Quality Strategy 2023. [online] <https://www.gov.uk/government/publications/the-air-quality-strategy-for-england/air-quality-strategy-framework-for-local-authority-delivery>.
11. 1990 c.43. Environmental Protection Act. HMSO.
12. 1993 c.11. Clean Air Act 1993. HMSO.
13. Ministry of Housing, Communities and Local Government. National Planning Policy Framework. December 2023.
14. Ministry of Housing, Communities and Local Government. 2019. Planning Practice Guidance: Air Quality. [online] <https://www.gov.uk/guidance/air-quality--3>.
15. SI 1927. The Conservation of Habitats and Species (Amendment) Regulation 2012.
16. Horsham District Council. 2015. Horsham District Planning Framework (excluding South Downs National Park).
17. Horsham District Council. 2020. New Local Plan: Proposed Submission Version.
18. Horsham District Council. 2024. Air Quality Annual Status Report 2023.
19. West Sussex County Council. 2020. Air Quality Action Plan: Breathing Better.
20. West Sussex County Council. 2023. Air Quality Action Plan: Breathing Better.
21. Sussex Air Quality Partnership. 2021. Air quality and emissions mitigation guidance for Sussex (2021).
22. Environmental Protection UK and Institute of Air Quality Management. 2017. Land-Use Planning & Development Control: Planning for Air Quality
23. Institute of Air Quality Management (IAQM). 2024. Guidance on the Assessment of Dust from Demolition and Construction. Version 2.2.
24. Department for Environment, Food and Rural Affairs. (Defra). Background mapping for local authorities. [online] <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.
25. Department for Environment, Food and Rural Affairs (Defra). 2022. Local Air Quality Management Technical Guidance (TG-22).
26. Department for Environment, Food and Rural Affairs. 2024. Emissions Factor Toolkit (version 12.1). [online] <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/>.



27. Department for Environment, Food and Rural Affairs. 2020. NOX:NO2 calculator (version 8.1). [online] <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/>.
28. British Geological Survey. 2024. Geology of Britain Viewer. Natural Environment Research Council. [online]. <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>.
29. Department for Environment, Food and Rural Affairs. 2023. Air quality appraisal: damage costs toolkit. [online] https://assets.publishing.service.gov.uk/media/6400aaa48fa8f527fe30db95/Air_Quality_Damage_Cost_Appraisal_Toolkit_February_2023.ods/preview.

Draft

Appendix A: Model Input

ADMS-Roads model parameters used in the assessment are shown in Table A1 below.

Table A1: Model Input Parameters

Parameter	Verification & Dispersion Site Value	Met. Site Value
Latitude (degrees)	52	-
Surface roughness length (m)	0.5	0.5
Minimum Monin-Obukhov length (m)	10	10
Surface Albedo (model default)	0.23	0.23
Priestley-Taylor parameter (model default)	1	1
Precipitation (met site data)	-	-
Emission Year (all scenarios 2023 and 2025)	2023, 2025	-
EFT Road Type	Rural (not London), Urban (not London)	-
EFT Area	England (not London)	-

Road Sources

The following roads were modelled. Road widths were measured from aerial maps. This information is presented in Table A2.

Table A2: Modelled Road Links

Link ID	Description	Modelled Road Elevation (m)	Modelled Road Width (m)	Canyon Height (m)
01	Site Entrance	0	8	0
02	Shoreham Road (A2307) South of Entrance	0	9.5	0
02_1	Shoreham Road (A2307) South of Entrance	0	6.5	0
03	Shoreham Road (A2307) North of Entrance	0	10	0
03_1	Shoreham Road (A2307) North of Entrance	0	6	0
03_2	Shoreham Road (A2307) North of Entrance	0	6.5	0
03_3	Shoreham Road (A2307) North of Entrance	0	7	0
03_4	Shoreham Road (A2307) North of Entrance	0	6	0
03_5	Shoreham Road (A2307) North of Entrance	0	6	0
03_6	Shoreham Road (A2307) North of Entrance	0	6	0
03_7	Shoreham Road (A2307) North of Entrance	0	7.5	0

Link ID	Description	Modelled Road Elevation (m)	Modelled Road Width (m)	Canyon Height (m)
04_1	Nep Town Road	0	6	0
04_2Jct	Nep Town Road	0	10	0
05_Jct	High Street (A281)	0	9	0
05_1	High Street (A281)	0	10	9
05_2	High Street (A281)	0	10	9
05_3	High Street (A281)	0	13.5	9
05_4	High Street (A281)	0	9	0
05_5	High Street (A281)	0	13	9
06_Jct	Brighton Road (A281)	0	6.5	0
06_1	Brighton Road (A281)	0	6	0
06_2	Brighton Road (A281)	0	6	0
Rnd1	A2037/A281/Golden Square Roundabout	0	4.5	0
Rnd2	A2037/A281/Golden Square Roundabout	0	4.5	0

Traffic Data

Major road links within at least 200 m of the development site and assessed receptors were modelled and the associated traffic data are presented in Table A3.

Minor roads were accounted for indirectly through background concentrations.

Road traffic data, including AADT flows, average speeds and HGV %, for all modelled scenarios, were provided by Motion Consultants Limited. Where required (e.g. road junctions and roundabouts), average speeds and traffic flows were adjusted within the model in line with LAQM-TG22.

Time Varying Emission Factors

Hourly time varying emission factors were entered into the model using a '.fac' file to ensure that diurnal variation of the local traffic was taken into account for weekdays, Saturdays and Sundays.

Time varying emission factors used are based on national 2023 traffic flow data. The dataset was acquired from the Department of Transport: Road Traffic Statistics database.

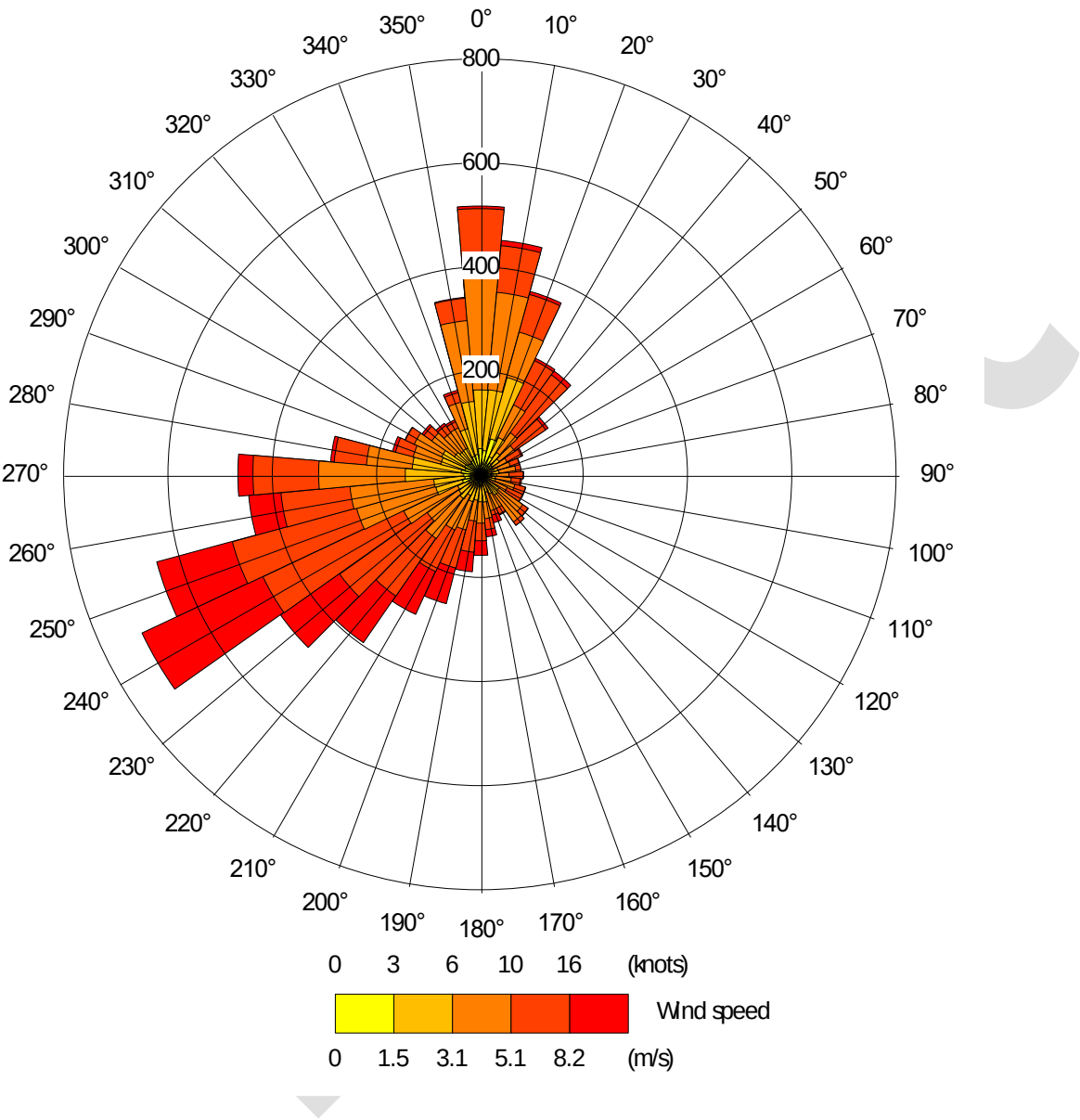
Traffic data used in all modelled scenarios is detailed in Table A3.

Table A3: Traffic Data Used in the Assessment

Road ID	2023		2025		2025		Vehicle Speed (km/h)
	Baseline/Verification		Without Development		With Development		
	Total AADT	HGV%	Total AADT	HGV%	Total AADT	HGV%	
01	65	62	66	62	466	17	24.1
02	4,303	5	4,483	5	4,659	5	64
02_1	4,303	5	4,483	5	4,659	5	64
03	4,336	5	4,517	5	4,741	5	64
03_1	4,336	5	4,517	5	4,741	5	64
03_2	4,336	5	4,517	5	4,741	5	48.2
03_3	4,336	5	4,517	5	4,741	5	64
03_4	4,336	5	4,517	5	4,741	5	64
03_5	4,336	5	4,517	5	4,741	5	48.2
03_6	4,336	5	4,517	5	4,741	5	64
03_7	4,336	5	4,517	5	4,741	5	48.2
04_1	4,637	5	4,821	5	5,045	5	48.2
04_2Jct	4,637	5	4,821	5	5,045	5	24.1
05_Jct	6,319	6	6,682	6	6,814	6	24.1
05_1	6,319	6	6,682	6	6,814	6	32.2
05_2	6,319	6	6,682	6	6,814	6	24.1
05_3	6,319	6	6,682	6	6,814	6	48.2
05_4	6,319	6	6,682	6	6,814	6	48.2
05_5	6,319	6	6,682	6	6,814	6	32.2
06_Jct	3,954	7	4,159	6	4,251	6	24.1
06_1	3,954	7	4,159	6	4,251	6	48.2
06_2	3,954	7	4,159	6	4,251	6	64
Rnd1	7,455	6	7,831	6	8,055	6	16.1
Rnd2	7,455	6	7,831	6	8,055	6	16.1



Appendix B: Wind Rose for Shoreham 2023



Appendix C: Model Verification

Model verification for NO₂ has been conducted using the nearest diffusion tube site run by Horsham District Council (HDC). The monitored road contribution NO_x was calculated using Defra's latest NO_x to NO₂ calculator (version 8.1). Diffusion tube location NO₂ data were taken from HDC's Air Quality ASR for 2023. Details are listed in Table C1 below.

Table C1: Diffusion Tube Data Used for Model Verification

Verification ID	X, Y Co-ordinates	Height Above Ground (m)	Distance to nearest Kerb (m)	Monitored NO ₂ (µg/m ³)
2-Henfield 1n	521492, 115907	2	2	18.2

Relevant Defra backgrounds for 2023 according to location were used in the model verification.

The same verification factor was used for the 2023 and 2025 scenarios.

Modelled road contributions to NO_x were compared to monitored road contributions to NO_x. Monitored road NO_x contributions were calculated with Defra's NO_x to NO₂ calculator. Initial verification results are shown in Table C2 below. This shows that the model under-estimated road NO_x contributions at the verification sites, though overall the model predicted concentrations accurately.

Table C2: Comparison of Monitored and Modelled NO_x And NO₂ Data

Site ID	Background NO ₂ (µg/m ³)	Background NO _x (µg/m ³)	Monitored Total NO ₂ (µg/m ³)	Monitored NO ₂ Road Contribution (µg/m ³)	Monitored NO _x Road Contribution (µg/m ³)	Modelled NO _x Road Contribution (µg/m ³)	Ratio of Monitored Road Contribution NO _x : Modelled Road Contribution NO _x
2-Henfield 1n	7.4	9.5	18.2	10.8	20.1	11.3	1.78

A NO_x adjustment factor of 1.78 was applied to all modelled road NO_x concentrations. Defra's NO_x:NO₂ calculator was used to derive modelled NO₂ concentrations, using adjusted modelled road NO_x and background NO₂ concentrations.

The NO_x adjustment factors were applied to all modelled road contributions and all modelled scenarios for NO_x, PM₁₀ and PM_{2.5}.

Appendix D: IAQM Significance Criteria

Impact descriptors for individual existing receptors is presented in Table D1 below. This is based on the IAQM guidance for new development.

Table D1: IAQM Significance Criteria

Annual mean concentrations at receptors in the assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Explanation

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
2. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5%, will be described as Negligible.
3. The Table is only designed to be used with annual mean concentrations.
4. Descriptors for individual receptors only; the overall significance is determined using professional judgement (see Chapter 7). For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.
5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.
6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.
7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.