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Esquire Developments Ltd

Rose Farm, Istead Rise

Air Quality Assessment

REPORT REF.

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Statement of Competence

The following authors of this report are Members of the Institute of Air Quality Management (IAQM) and possess the requisite qualifications, expertise, and experience to conduct robust air quality assessments and analyses in accordance with regulatory standards and best practices.

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1 Introduction

Background

1.1 This report has been prepared in support of an outline planning application for a residential development at Rose Farm, Istead Rise, located within Gravesham Borough Council (GBC). The development description is as follows:

"Outline planning application for the demolition of 64 Downs Road and erection of up to 154No. residential dwellings (including affordable housing), with all matters reserved except for access. Creation of a new access from Downs Road."

Site Location and Context

1.2 The Site is located on land approximate National Grid Reference (NGR): 563155, 169631. The Site location is shown below.

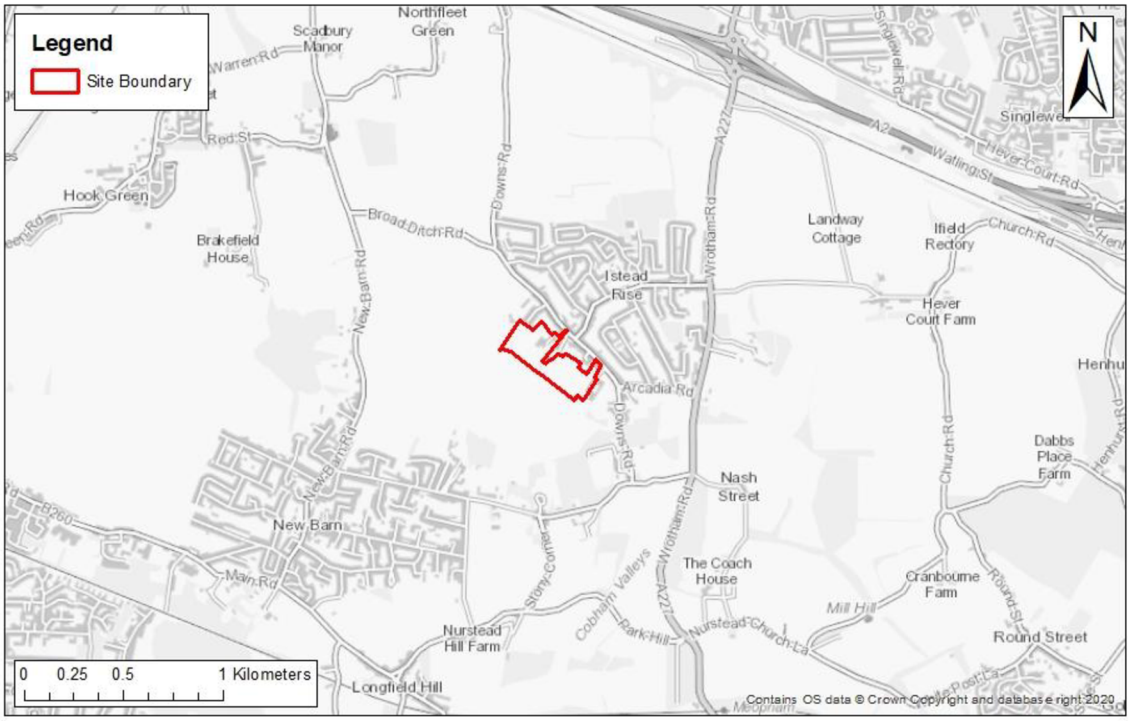

Figure 1-1: Site Location

1.3 The Proposed Development has the potential to cause impacts, including fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the Site during the operation phase. Energy

plant installed to provide heating and hot water during operation could also affect local air quality.

1.4 An AQA was therefore undertaken to determine baseline conditions and consider potential impacts and effects associated with the Proposed Development during construction and operation against this baseline, in air quality terms, as detailed in the following report.

2 Approach

2.1 The approach to preparing an AQA in the UK typically involves the following steps:

Screening and Scoping

2.2 Screening identifies if an AQA is needed by evaluating potential emissions and their likely impacts. This involves considering the type and scale of the project and its proximity to sensitive receptors (e.g., residential areas, schools, hospitals).

2.3 Scoping then defines the scope of the assessment, including the pollutants to be considered, the geographical area to be covered, and the receptors to be included.

2.4 The relevant screening assessment is provided below, followed by the scope of assessment determined to be required to appropriately assess the potential air quality impacts and effects of the Proposed Development.

Screening

Construction Phase

Fugitive Dust Emissions: Impact

2.5 The construction phase of the Proposed Development has the potential for fugitive dust emissions to occur owing to construction phase activities, such as demolition, earthworks, construction and trackout activities.

2.6 The potential for impacts at sensitive locations of relevant exposure depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

2.7 The desk-study undertaken to inform the baseline (see Section 4) identifies several sensitive receptors within 250m of the red line boundary of the Site. As such, further assessment of potential dust impacts has been undertaken (see Appendix A for the construction phase methodology).

Construction Traffic Emissions: Impact

2.8 The Institute of Air Quality Management (IAQM) advise that from experience of assessing exhaust emissions from site traffic, it is unlikely that any significant adverse impacts on local air quality would be caused, and in most cases, quantitative assessment is not needed.

Operation Phase

Road Traffic Emissions: Impact (Human Health)

2.9 The Proposed Development has been screened against the following indicative criteria for requiring an AQA as detailed in the EPUK & IAQM 'Land use Planning & Development Control: Planning for Air Quality, V1.2' guidance:

Table 2-1: EPUK & IAQM Indicative Criteria for Requiring Detailed Assessment

Criteria	Evaluation
A change in Light-Duty Vehicle traffic flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA), or more than 500 AADT elsewhere on local roads with relevant receptors.	Yes
A change in Heavy-Duty Vehicle (HDV) flows of more than 25 AADT within or adjacent to an AQMA, or more than 100 AADT elsewhere on local roads with relevant receptors.	No
A change in the alignment of roads by 5m or more and the road is within an AQMA.	No
Introduction of a new junction or remove an existing junction that cause traffic to significantly change vehicle accelerate/decelerate, e.g., traffic lights, or roundabouts, near to relevant receptors.	No
Introduce or change a bus station, where bus flows will change by more than 25 AADT within or adjacent to an AQMA, or more than 100 AADT elsewhere.	No
Has an underground car park with an extraction system within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).	No
Has one or more substantial combustion processes, including combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping, where there is a risk of impacts at relevant receptors.	No

2.10 DHA Planning, the transport consultants, have confirmed that the Proposed Development will increase two-way AADT movements exceeding the EPUK & IAQM screening criteria above on several roads within the 'Gravesham A2 AQMA'.

2.11 Therefore, detailed modelling of operational traffic impacts has been carried out using the ADMS-Roads dispersion model software. Further details of the modelling data inputs and results processing is provided in Appendix B.

2.12 The magnitude of impacts has been determined using the criteria set out within the EPUK & IAQM air quality planning guidance, as set out in Table 2-2.

Table 2-2: IAQM Impact Descriptors for Individual receptors

Annual Mean Concentration	% Change [a]			
	1[b]	2-5	6-10	>10
≤ 75%	Negligible	Negligible	Slight	Moderate
≤ 76% - ≤ 95%	Negligible	Slight	Moderate	Moderate
≤ 96% - ≤ 102%	Slight	Moderate	Moderate	Substantial
≤ 103% - ≤ 110%	Moderate	Moderate	Substantial	Substantial
≥110%	Moderate	Substantial	Substantial	Substantial

[a] In relation to an AQAL

[b] % change rounded to nearest whole number. Where the change is 0 (i.e. <0.5) the impact will be Negligible.

2.13 When considered at individual receptors, moderate or substantial impacts may be considered significant and Negligible or slight impacts not significant. Consideration of the overall effect on air quality needs to incorporate consideration of impacts, including the extent to which receptors represent sensitive locations and whether this wider impact is significant or not.

2.14 The assessment of overall significance is therefore made based on professional judgement, considering factors such as:

- The number of properties affected by different levels of impacts;

- The magnitude of any changes and descriptors (as identified in stages 1 and 2);
- Whether a new exceedance of an Air Quality Assessment Level ((AQAL) – see Table 3-1) is predicted to arise, or an existing exceedance is removed, or an existing exceedance is substantially increased or reduced;
- The level of uncertainty, including the extent to which worst-case assumptions have been made; and
- The extent of any exceedance of an AQAL.

2.15 Additional factors are also included in the assessment of significance, including the spatial extent of adverse impacts, in accordance with EPUK & IAQM guidance, which states:

"An individual property exposed to a moderately adverse impact might not be considered a significant, but many hundreds of properties exposed to a slight adverse impact could be."

Road Traffic Emissions: Impact (Ecology)

2.16 There are no ecological sites located within 200m of roads in which development generated traffic is anticipated to travel, as such further assessment has been screened out.

Road Traffic Emissions: Exposure / Site Sensitivity

2.17 The development site is southeast of residential properties adjacent to Downs Road. Road traffic emissions on this road have the potential to influence air quality at new receptors within the development site. As such, further consideration of potential exposure air pollution has been undertaken.

Combustion Plant Emissions: Impacts

2.18 No known combustion plant is incorporated into the design of the Proposed Development. Therefore, no further consideration of combustion plant emissions has been undertaken.

Scope

Scoped In

2.19 The following elements have been included with the scope of the AQA due to the screening assessment identifying a risk of potential effects requiring further assessment:

1. Construction Phase
    a. Construction Activities (Impacts)
        i. Dust, PM_{10}

2. Operation Phase
    a. Operation Traffic Emissions (Impacts)
        i. Human Health
            A. NO_2, PM_{10}, $PM_{2.5}$
    b. Road traffic emissions (Exposure)
        i. NO_2, PM_{10}, $PM_{2.5}$
    c. Damage Cost Calculations

Scoped Out

2.20 The following elements have been excluded from the detailed scope of the AQA based on the outcome of the screening assessment:

1. Construction Phase
    a. Construction Traffic Emissions (Impacts)

2. Operation Phase
    a. Combustion Plant Emissions (Impacts)
        i. NO_2, PM_{10}, $PM_{2.5}$

    b. Road traffic emissions (Ecology)

        i. Oxides of nitrogen (NO_x), Ammonia (NH_3), nitrogen deposition, acid deposition.

3 Policy, Legislation and Guidance

3.1 To inform the assessment the following Policy, Legislation, and Guidance have been considered:

Policy

National Planning Policy

National Planning Policy Framework

3.2 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. The purpose of the planning system is to contribute to the achievement of sustainable development. To ensure this, the NPPF recognises 3 overarching objectives, including the following of relevance to air quality:

> *"Chapter 2 Achieving sustainable development*
>
> *Para. 8*
>
> *c) an environmental objective - to protect and enhance our natural, built, and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."*

3.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

> *"Chapter 15 Conserving and enhancing the natural environment*
>
> *Para. 187*
>
> *Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *[…]*

preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

Development should, wherever possible, help to improve local environmental conditions such as air and water quality;"

3.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

"Ground conditions and pollution

Para. 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. In doing so they should:

A) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

B) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

C) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes, and nature conservation.

Para. 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."

3.5 The implications of the NPPF have been considered throughout this assessment.

Local Planning Policy

The Local Plan

3.6 The Council's current adopted Local Plan Core Strategy is the main document in the Gravesham Local Plan. The following policy is relevant to this assessment:

'Policy CS19: Development and Design Principles' states:

"…

New Development will be located, designed and constructed to:

…avoid adverse environmental impacts from pollution, including noise, air, odour…"

Legislation

3.7 There are two sets of air quality legislation which include ambient air quality thresholds for the protection of public health that apply in England, these include legally binding Limit Values originally set by the European Union (EU) Directive on ambient air quality and cleaner air for Europe (2008/50/EC) (which were transposed

into UK law through the Air Quality Standards Regulations 2010), and regulations implementing national air quality objectives as set out in the Air Quality Strategy (AQS) 2023 for England which local authorities are required to work towards achieving.

3.8 The AQS sets out the Government's policies and framework for improving air quality in the UK with the aim of meeting the requirements of the 2008/50/EC Directive. The AQS also outlines the Limit Values, Target Values, Standards, Objectives, Critical Levels, and Exposure Reduction Targets for the protection of human health and the environment.

3.9 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 also brought forward a new target level for $PM_{2.5}$.

3.10 The relevant Limit Values, Target Values, Standards, Objectives, Critical Levels and Exposure Reduction Targets are collectively termed AQALs throughout this report.

Table 3-1: Air Quality Assessment Levels (AQALs)

Pollutant	AQAL	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
$PM_{2.5}$	20	Annual mean
	12	Annual Mean Interim Target ((AMIT) to be met across England by 2028)
	10	Annual Mean Concentration Target (AMCT) - To be met across England by 2040
	-	Population Exposure Reduction Target (PERT) - 35% reduction in population exposure by 2040 (compared to a base year of 2018)

3.11 With specific reference to the AMIT and AMCT for $PM_{2.5}$, it should be noted that that the dates for compliance are 2028 and 2040, respectively. The applicable $PM_{2.5}$ AQAL for the purposes of this assessment therefore remains to be the current AQAL of 20µg/m^3.

3.12 However, in line with the Defra "$PM_{2.5}$ Interim Planning Guidance on the consideration of the Environment Act $PM_{2.5}$ targets in planning decisions" the operation phase assessment will also aim to consider the 2040 AMCT for $PM_{2.5}$, identify key sources of $PM_{2.5}$ air pollution from the Proposed Development, and outline the measures proposed to minimise emissions of $PM_{2.5}$ and its precursors as far as is reasonably practicable.

Guidance

National Guidance

National Planning Practice Guidance

3.13 Reference ID 32 (Air Quality) of the National Planning Practice Guidance (NPPG), which was updated in November 2019, provides guiding principles on how planning can take account of the impact of new development on air quality.

3.14 The NPPG summarises the importance of air quality in planning and the key legislation relating to it.

Defra Technical Guidance

3.15 Table 3-2 summarises the advice provided in Defra's Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22)) on where the AQALs for pollutants considered within this report apply.

Table 3-2: Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes, etc.	Building façades of offices or other places of work where members of the public do not have regular access.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
		Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations, and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Non-statutory guidance

3.16 The following guidance documents have been reviewed / followed / referred to in preparing this AQA:

- The EPUK & IAQM 'Land use Planning & Development Control: Planning for Air Quality', (2017 V1.2);
- The IAQM's 'Assessment of dust from demolition and construction' (2024 V2.2); and
- Kent & Medway Air Quality Partnership 'Air Quality Planning Guidance (Mitigation Option A)' (2015).

4 Baseline Conditions

4.1 Existing air quality conditions in the vicinity of the Proposed Development Site were identified to provide a baseline for the assessment. These are detailed in the following Sections.

Local Air Quality Management

4.2 As required by the Environment Act (1995), the Council have undertaken Review and Assessment of air quality within their area of authority. This process has indicated that annual mean concentrations of NO_2 are above the AQAL within the Borough. As such, three AQMAs are currently declared, these being:

- 'Gravesham A2 AQMA' – declared for exceedances of the NO_2 annual mean objective, and PM_{10} 24-Hour mean objective;
- 'Gravesham A227 Wrotham Road / B261 Old Road West AQMA' – declared for exceedances of the NO_2 annual mean objective; and
- 'Gravesham A226 One-way system AQMA' – declared for exceedances of the NO_2 annual mean objective

4.3 The development is located approximately 1.6km south of the 'Gravesham A2 AQMA', the nearest AQMA to the Site.

Clean Air Zones (CAZ)

4.4 GBC has not been identified by The National Air Quality Plan as being required to implement a CAZ, nor produce a local action plan to address predicted exceedances of the NO_2 EU Limit Value within its area.

Air Quality Monitoring

4.5 Monitoring of pollutant concentrations is undertaken by GBC throughout their area of authority. Annual mean NO_2 results recorded in the vicinity of the development taken from readily available information online are shown in Figure 4-1 and Table 4-1.

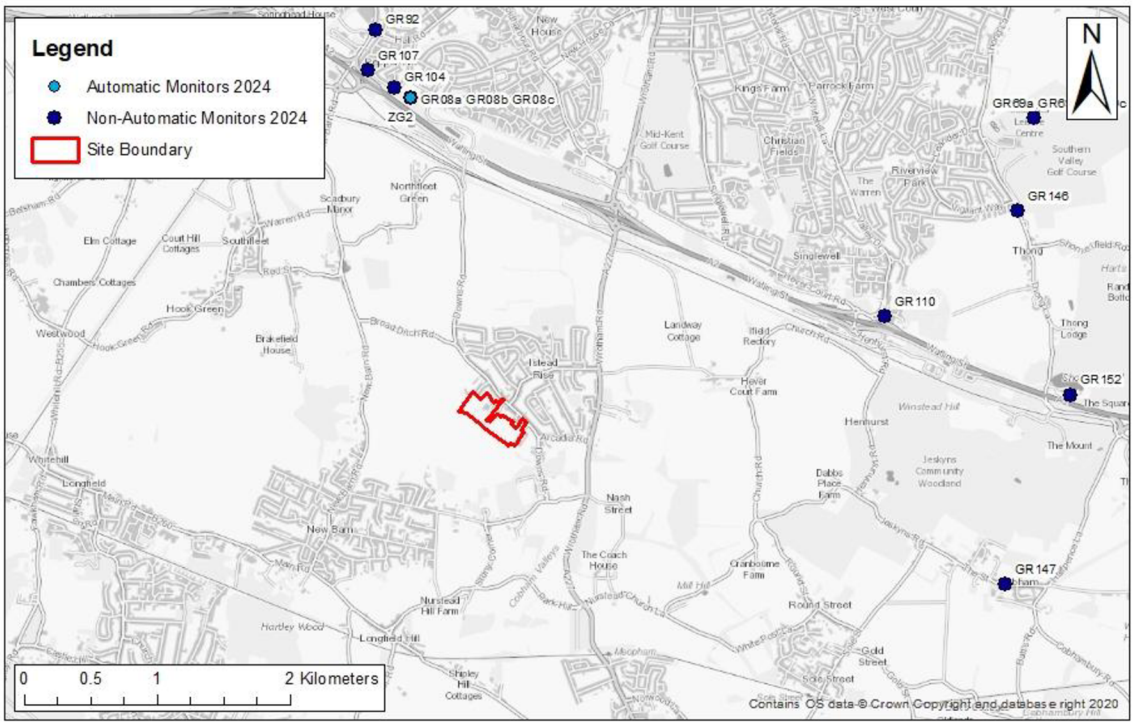

Figure 4-1: Local Monitoring

Table 4-1: Local Monitoring – NO_2

Site ID	Monitor Type	Monitored NO_2 Concentration ($\mu g/m^3$)				
		2020	2021	2022	2023	2024
ZG2	Automatic Monitor	23.7	22.8	22.2	19.5	18.6
GR08a, GR08b, GR08c	Roadside Diffusion Tube	24.3	23.9	22.4	18.9	17.7
GR 104	Urban Background Diffusion Tube	29.2	28.3	26.9	23.2	21.4
GR 107	Urban Background Diffusion Tube	30.6	29.8	27.7	24.1	21.5
GR 92	Urban Background Diffusion Tube	33.3	33.0	29.0	27.8	24.1
GR 110	Urban Background Diffusion Tube	32.1	29.7	28.3	24.6	18.6

Site ID	Monitor Type	Monitored NO_2 Concentration (µg/m³)				
		2020	2021	2022	2023	2024
GR147	Roadside Diffusion Tube	23.9	25.3	22.1	19.7	17.7
GR 152	Roadside Diffusion Tube	-*	-*	-*	-*	20.2
GR 146	Roadside Diffusion Tube	14.9	14.3	13.9	12.5	10.4
GR69a, GR69b, GR69c	Roadside Diffusion Tube	16.3	15.8	15.2	13.1	11.3

-* No data available

4.6 As shown in Table 4-1, monitored NO_2 concentrations have not exceeded the AQAL of 40 µg/m³ in recent years. Given its location and site surrounding, local monitor GR147 can be considered to be representative of baseline conditions at the Site.

4.7 Automatic monitor ZG2 also undertakes monitoring of PM_{10} concentrations, annual mean concentrations are shown in Table 4-2 below. Monitoring of $PM_{2.5}$ is not currently undertaken within the vicinity of the Site, however.

Table 4-2: Local Monitoring – PM_{10}

Site ID	Monitor Type	Monitored PM_{10} Concentration (µg/m³)				
		2020	2021	2022	2023	2024
ZG2	Automatic Monitor	16.3	16.0	15.3	11.7	10.3

4.8 As shown in Table 4-2, annual mean concentrations of PM_{10} are below all relevant AQALs.

Background Pollution Concentrations

4.9 Predictions of background pollutant concentrations on a 1km-by-1km grid basis have been produced by Defra for the entire of the UK to assist local authorities in their Review and Assessment of air quality.

4.10 The Proposed Development site is in grid square NGR: 561500, 169500. Data for this location was downloaded from the Defra website for the purpose of this assessment and is summarised in Table 4-3.

4.11 Background concentrations have been provided for 2024 (the year latest local monitoring data is available) and 2028 (the assessed completion year).

Table 4-3: Background Pollution Concentrations

Pollutant	Predicted Background Concentration ($\mu g/m^3$)	
	2024	2028
NO_2	10.9	9.6
PM_{10}	11.1	10.8
$PM_{2.5}$	6.6	6.3

4.12 As shown in Table 4-3, predicted background NO_2, PM_{10}, and $PM_{2.5}$ concentrations are below the relevant AQALs at the development site.

Sensitive Receptors

4.13 A sensitive receptor is defined as any location which may be affected by changes in air quality because of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

Construction Phase

4.14 Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk top study of the area up to 250m from the development boundary. These are summarised in Table 4-4.

Table 4-4: Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate No. of Human Receptors	Approximate No. of Ecological Receptors
<20	10-100	0
<50	10-100	0
<100	> 100	1
<250	> 100	1

4.15 Of the sensitive receptors identified above, most notably these include Young Risers Pe-School and Kiddiecare Kindergarten, and Istead Rise Primary School, located within 20m and 50m of the Site boundary respectively.

4.16 Receptors sensitive to potential dust impacts from trackout were identified from a desk top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 4-5.

Table 4-5: Trackout Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate No. of Human Receptors	Approximate No. of Ecological Receptors
<20	10 – 100	0
<50	10 – 100	0

4.17 There are no ecological receptors within 50m of the development boundary or the access route within 500m of the site entrance. As such, ecological impacts have not been assessed further within this report.

4.18 Several additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 4-6.

Table 4-6: Additional Area Sensitivity Factors to Potential Dust Impacts

Factor	Comment
Whether there is any history of dust generating activities in the area.	The desk top study did not indicate any dust generating activities in the local area.
The likelihood of concurrent dust generating activity on nearby sites.	A review of the local planning portal did not highlight any additional dust generating activities that may be concurrently present at the time of construction.
Pre-existing screening between the source and the receptors.	There is no pre-existing screening between the site and surrounding receptors.
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place.	The predominant wind bearing at the site is from the southwest. As such, receptors to the northeast are most likely to be affected by dust releases. As shown in Figure 8-1.
Conclusions drawn from local topography.	There are no significant topographical constraints to dust dispersion.
Duration of the potential impact, as a receptor may become more sensitive over time.	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over 3 - 4 years.
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline assessment.

4.19 The sensitivity of the receiving environment to potential dust impacts is set out below.

Table 4-7: Sensitivity of the Surrounding Area to Potential Dust Impacts

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

Operation Phase

Human Health

4.20 Relevant sensitive locations are those where members of the public will be regularly present over the averaging period of the relevant AQALs. Sensitive locations considered include existing residential properties. The following sensitive receptors were identified for inclusion within the operation phase assessment.

Table 4-8: Operation Phase Existing Receptors (Human)

Receptor	Description	Coordinates		Height
		X	Y	(m)
R1	Façade of existing residential property, fronting onto Roman Road	562458	172158	1.5
R2	Façade of existing residential property, fronting onto Pepper Hill	562273	172281	1.5
R3	Façade of existing residential property, fronting onto A2	562203	172329	1.5
R4	Façade of existing residential property, fronting onto Hall Road	562221	172359	1.5

5 Predicted Impacts

Construction Phase

Demolition

5.1 Table 5-2 shows the evaluation of the potential magnitude of impacts from demolition activities.

Table 5-1: Demolition Impact Magnitude

Category	Criteria	Evaluation
Large	Total building volume greater than 75,000m^3.	No
	Potentially dusty construction material (e.g., concrete).	
	On-site crushing and screening.	
	Demolition activities greater than 12m above ground level.	
Medium	Total building volume between 12,000m^3 75,000m^3.	Yes
	Potentially dusty construction material.	
	Demolition activities between 6 to 12m above ground level.	
Small	Total building volume less than 12,000m^3.	No
	Construction material with low potential for dust release (e.g. metal cladding or timber).	
	Demolition activities less than 6m above ground level.	

5.2 The potential magnitude of impacts from demolition activities is estimated to be Medium.

Earthworks

5.3 Table 5-2 shows the evaluation of the potential magnitude of impacts from earthworks activities.

Table 5-2: Earthworks Impact Magnitude

Category	Criteria	Evaluation
Large	Total site area greater than 110,000m^2.	No
	Potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size).	
	More than 10 heavy earth moving vehicles active at any one time.	
	Formation of bunds greater than 6m in height.	
Medium	Total site area 18,000m^2 to 110,000m^2.	Yes
	Moderately dusty soil type (e.g., silt).	
	5 to 10 heavy earth moving vehicles active at any one time.	
	Formation of bunds 3m to 6m in height.	
Small	Total site area less than 18,000m^2.	No
	Soil type with large grain size (e.g., sand).	
	Less than 5 heavy earth moving vehicles active at any one time.	
	Formation of bunds less than 3m in height.	
	Earthworks during wetter months.	

5.4 The potential magnitude of impacts from earthworks activities is estimated to be Medium.

Construction

5.5 Table 5-3 shows the evaluation of the potential magnitude of impacts from construction activities.

Table 5-3: Construction Impact Magnitude

Category	Criteria	Evaluation
Large	Total building volume greater than 75,000m^3	No
	On-site concrete batching	
	Sandblasting	
Medium	Total building volume 12,000m^3 to 75,000m^3	Yes
	Potentially dusty construction material (e.g., concrete)	
	On-site concrete batching	
Small	Total building volume less than 12,000m^3	No
	Construction material with low potential for dust release (e.g., metal cladding or timber)	

5.6 The potential magnitude of impacts from construction activities is estimated to be Medium.

Trackout

5.7 Table 5-4 shows the evaluation of the potential magnitude of impacts from trackout activities.

Table 5-4: Trackout Impact Magnitude

Category	Criteria	Evaluation
Large	More than 50 HDV trips per day	No
	Potentially dusty surface material (e.g., high clay content)	
	Unpaved road length greater than 100m	
Medium	20 to 50 HDV trips per day	Yes

Category	Criteria	Evaluation
	Moderately dusty surface material (e.g., high clay content)	
	Unpaved road length 50m to 100m	
Small	Less than 20 HDV trips per day	No
	Surface material with low potential for dust release	
	Unpaved road length less than 50m	

5.8 The potential magnitude of impacts from trackout activities is estimated to be Medium

Summary of Potential Unmitigated Dust Risks

5.9 A summary of the risk from each dust generating activity is provided in Table 5-5:

Table 5-5: Summary of Potential Unmitigated Dust Risks

Potential Impact		Risk				
		Demolition	Earthworks	Construction	Trackout	Overall
Magnitude / Sensitivity		Medium	Medium	Medium	Medium	Medium
Dust Soiling	High	Medium	Medium	Medium	Medium	Medium
Human Health	Low	Medium	Low	Low	Low	Low
Overall						**Medium**

5.10 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during most of the construction phase.

Operation Phase

Road Traffic Emissions: Impact (Human Health)

5.11 Annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been predicted at existing receptors in 2028. The predicted concentrations, percentage change at relevant objectives, and the impact at each receptor is shown in the tables below.

Table 5-6: Predicted Annual Mean Concentrations of NO_2 (µg/m^3)

Receptor	DM	DS	DS of AQAL	Change of AQAL	Impact
	(µg/m^3)	(µg/m^3)	%	%	
R1	17	17	43	0	Negligible
R2	19	19	48	0	Negligible
R3	21	21	53	0	Negligible
R4	18	18	45	0	Negligible

Table 5-7: Predicted Annual Mean Concentrations of PM_{10} (µg/m^3)

Receptor	DM	DS	DS of AQAL	Change of AQAL	Impact
	(µg/m^3)	(µg/m^3)	%	%	
R1	19	19	48	0	Negligible
R2	22	22	55	0	Negligible
R3	26	26	65	0	Negligible
R4	21	21	53	0	Negligible

Table 5-8: Predicted Annual Mean Concentrations of $PM_{2.5}$ (µg/m³)

Receptor	DM	DS	DS of AQAL	Change of AQAL	Impact
	(µg/m³)	(µg/m³)	%	%	
R1	10	10	25	0	Negligible
R2	12	12	30	0	Negligible
R3	15	15	38	0	Negligible
R4	12	12	30	0	Negligible

5.12 Annual mean concentrations of NO_2 and PM_{10}, are below the relevant national objectives. As such impacts resulting from the development in relation to these pollutants are predicted to be 'not significant'.

5.13 With regard to $PM_{2.5}$, it is noted that concentrations at R3 in the DM scenario are 100% of the current AQAL, and concentrations are above the AMIT at R2 - R4 as well. However, the magnitude of impact remains Negligible in this context.

5.14 Furthermore, and as discussed in Appendix B, in the absence of $PM_{2.5}$ monitoring, a PM_{10} adjustment factor has been applied, so $PM_{2.5}$ results would reasonably be expected to be lower than presented and are considered to be conservative.

5.15 Damage costs are presented below, which accounts for $PM_{2.5}$ emissions further.

Road Traffic Emissions: Exposure / Site Sensitivity

5.16 The development is to introduce new high sensitive receptors in the form of residential dwellings. These proposed dwellings are to be sited approximately 75m away from the nearest emission source, Downs Road. As such, it is appropriate to compare expected pollutant concentrations across the Site to future background concentrations as projected by Defra. As shown in Table 4-2, pollutant concentrations are below all relevant AQALs, including the interim target for PM_{10} of 12 µg/m³ in 2028 (the year of completion).

5.17 Furthermore, as shown in Table 4-1, local monitoring has reported concentrations of NO_2, PM_{10}, and $PM_{2.5}$ below AQALs between 2020 and 2024. It should be noted that several of these local monitors are located within the 'Gravesham A2 AQMA' and adjacent to the A2.

5.18 It is considered therefore that future occupants of the development site are unlikely to be exposed to pollution concentrations above AQALs.

Damage Cost Calculations

5.19 Annual emissions of NO_X and $PM_{2.5}$ have been calculated using Defra's Emissions Factors Toolkit (EFT) v13 for the five-year period from 2028 (opening year) as per the Kent & Medway guidance.

Table 5-9: Damage Cost EFT Inputs

Area	Road Type	Traffic Flow	% HDV	Speed (kph)	Link Length (km)
England (not London)	Urban (Not London)	352	1.7	50[a]	10[a]

[a] Based on the values provided by Kent & Medway Air Quality Planning Guidance

5.20 For the purposes of this assessment, annual emissions have been calculated for 5 separate years (2028 through 2032) using the EFT. The emissions used for the calculation are shown below:

Table 5-10: Emissions in tonnes per annum

Pollutant	Road Type	Emissions (tonnes per annum)				
		2028	2029	2030	2031	2032
NO_X	Urban (Not London)	0.1723	0.1485	0.1270	0.1083	0.0922
$PM_{2.5}$	Urban (Not London)	0.0230	0.0226	0.0223	0.0221	0.0219

5.21 The output of the damage cost calculation using these emissions is shown below:

Table 5-11: Damage Cost Value

Pollutant	Low Sensitivity Value (£)	**Central Present Value (£)**	High Sensitivity Value (£)
NOx	£1,116	**£6,072**	£22,826
$PM_{2.5}$	£2,916	**£7,354**	£21,054
Total	£4,032	**£13,426**	£43,879

5.22 Summing the values for NO_x and $PM_{2.5}$ gives a total central present damage cost of £13,426. Mitigation measures have been costed to be proportionate to this damage cost value in Section 6 below.

6 Mitigation

Construction Phase

6.1 The full list of recommended mitigation measures for a 'medium' classification risk Site, as outlined within the IAQM guidance, is provided in Appendix C.

Operation Phase

6.2 No secondary mitigation measures are needed to manage the future exposure of residents to air pollution.

6.3 In relation to the damage cost calculations, as per the Kent & Medway Air Quality Planning Guidance, the following minimum mitigation is recommended:

- Travel plan (where required) including mechanisms for discouraging high emission vehicle use and encouraging the uptake of low emission fuels and technologies
- A Welcome Pack available to all new residents online and as a booklet, containing information and incentives to encourage the use of sustainable transport modes from new occupiers
- Eco-driver training and provision of eco-driver aid to all residents
- EV recharging infrastructure within the development (wall mounted or free standing in-garage or off-street points)
- Car club provision within development or support given to local car club/eV car clubs
- Designation of parking spaces for low emission vehicles
- Improved cycle paths to link cycle network
- Adequate provision of secure cycle storage
- Using green infrastructure, in particular trees to absorb dust and other pollutants

7 Conclusions

Construction Phase

7.1 Subject to the implementation of all relevant mitigation measures outlined in Appendix C, the residual impacts from dust generating activities are predicted to be not significant, in accordance with the IAQM guidance.

Operation Phase

7.2 Impacts from operation phase road traffic emissions are considered not significant, and future residents at the development site are considered unlikely to be exposed to pollution concentrations above AQALs.

Overall

7.3 The impacts and residual effects of the Proposed Development on air quality have been considered in the context of compliance with National Planning Policy as follows:

Table 7-1: Policy Compliance

Criteria	Evaluation	Comment
Do the proposals include new development that contributes to unacceptable levels of air pollution at other new development?	No	Positive outcome
Do the proposals include new development that is being put at unacceptable risk from unacceptable levels of air pollution?	No	Positive outcome
Do the proposals include new development that is adversely affected by unacceptable levels of air pollution?	No	Positive outcome
Do the proposals contribute to unacceptable levels of air pollution at existing development?	No	Positive outcome
Do the proposals put existing development at unacceptable risk from unacceptable levels of air pollution?	No	Positive outcome
Do the proposals sustain and contribute towards compliance with relevant limit values or national objectives for pollutants?	Yes	Positive outcome
Have opportunities to improve air quality or mitigate impacts been identified?	Yes	Positive outcome
Are the proposals consistent with the local air quality action plan?	Yes	Positive outcome

Criteria	Evaluation	Comment
Have air pollution risks been properly considered and adequate mitigation included to ensure there are no adverse impacts because of the development?	Yes	Positive outcome

7.4 The Proposed Development is considered therefore to fully comply with planning requirements.

8 Further Work

Pre-Construction

8.1 The following work is committed as part of the delivery of construction phase mitigation:

1. Stakeholder Communications Plan;
2. Dust Management Plan;
3. Monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring;
    a. To commence at least 3 months before site work
4. Construction Logistics Plan; and
5. Travel Plan.

Appendix A: Construction Phase Methodology

Step 1

Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Should human receptors be identified within 250m of the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route, then the assessment also proceeds to Step 2.

Step 2a - Potential Dust Emission Magnitude

Step 2a determines the potential for dust to arise during the construction phase. Activities on construction sites with the potential to generate dust can be categorised into 4 types of activities:

- Demolition
  - any activities associated with the removal of existing structures on the Site;
- Earthworks
  - includes the processes of soil-stripping, ground-levelling, excavation, and landscaping;
- Construction
  - any activities relating to the provision of new structures on the Site; and
- Trackout
  - the transport of dust and dirt from the Site onto the public road network where it may be deposited and re-suspended by vehicle traffic.

The potential dust emission magnitude for each of the activities is determined by the scale and magnitude of the works, and are classified as small, medium or large depending on the criteria outlined below in Table 8-1.

Table 8-1: Construction Dust - Magnitude of Emission

Activity	Potential Dust Emission Magnitude		
	Small	Medium	Large
Demolition	Total building volume <12,000m^3, construction material with low potential for dust release (e.g., metal cladding or timber), demolition activities <6m above ground, demolition during wetter months	Total building volume 12,000 m^3 – 75,000m^3, potentially dusty construction material, demolition activities 6-12m above ground level	Total building volume >75,000m^3, potentially dusty construction material (e.g., concrete), on-Site crushing and screening, demolition activities >12m above ground level
Earthworks	Total Site area <18,000m^2, soil type with large grain size, <5 heavy earth moving vehicles active at any one time, formation of bunds <3m in height	Total Site area 18,000m^2 – 110,000m^2, moderately dusty soil type, 5-10 heavy earth moving vehicles, formation of bunds 3m - 6m in height	Total Site area >110,000m^2, potentially dusty soil type (such as clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles, formation of bunds >6m
Construction	Total building volume <12,000m^3, construction material with low potential for dust release (such as metal cladding or timber)	Total building volume 12,000m^3 – 75,000m^3, potentially dusty construction material (such as concrete), on-Site concrete batching	Total building volume >75,000m^3, on-Site concrete batching, sandblasting
Trackout	<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved roads <50m	20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (such as high clay content), unpaved road length 50m – 100m	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (such as high clay content), unpaved road length >100m

Step 2b - Sensitivity of the Area to Construction Dust

Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors to determine individual receptor sensitivities are shown in Table 8-2.

Table 8-2: Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	**Ecological Receptors**
High	Users expect of high levels of amenity. High aesthetic or value property. People expected to be present continuously for extended periods of time. Locations where members of the public are exposed over a time period relevant to the AQAL for PM_{10}. e.g., residential properties, hospitals, schools, and residential care homes.	Internationally or nationally designated site e.g., Special Area of Conservation.
Medium	Users would expect to enjoy a reasonable level of amenity. Aesthetics or value of their property could be diminished by soiling. People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g., parks and places of work.	Nationally designated site e.g., Sites of Special Scientific Interest.
Low	Enjoyment of amenity would not reasonably be expected. Property would not be expected to be diminished in appearance. Transient exposure, where people would only be expected to be present for limited periods. e.g., public footpaths, playing fields, shopping streets, farmland, short term car parks, and roads.	Locally designated site e.g., Local Nature Reserve.

The sensitivity of the area is defined separately for dust soiling impacts, human health impacts and ecological impacts according to the criteria shown in the following tables, derived from IAQM guidance.

Table 8-3: Sensitivity of the Area to Dust Soiling

Receptor Sensitivity	No. of Receptors	Distance from the Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 8-4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	No. of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32 µg/m^3	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Medium
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentration	No. of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m³	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m³	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 µg/m³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	<1	Low	Low	Low	Low

Table 8-5: Sensitivity of the Area to Ecological Impacts

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

Step 2c - Risk of Impacts

Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without mitigation (i.e., excluding embedded mitigation), according to the matrices below.

The risk of impacts is determined for each of the 4 activities using the matrices prescribed in the IAQM guidance, as reproduced below:

Table 8-6: Dust Risk Category from Demolition Activities

Receptor Sensitivity	Distance from the Source (m)		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Low	Low	Negligible

Table 8-7: Dust Risk Category from Earthworks and Construction Activities

Receptor Sensitivity	Distance from the Source (m)		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 8-8: Dust Risk Category from Trackout Activities

Receptor Sensitivity	Distance from the Source (m)		
	Large	Medium	Small
High	High	Medium	Low

Receptor Sensitivity	Distance from the Source (m)		
	Large	Medium	Small
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Step 3

Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with Negligible risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final Step is to determine the significance of any residual impacts. For most construction activity, the aim should be to control effects using effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be not significant.

Appendix B: Operation Phase Methodology

Overview

Table 8-9: ADMS-Roads Model Inputs Processing Tools

Model Input Parameter	Details
Model Version	A detailed AQA has been undertaken using the air dispersion model ADMS-Roads. The software is commercially available, has been accepted for this type of assessment by Defra and is used extensively for AQA's. ADMS-Roads provides an estimate of ambient pollution concentrations, considering important input data such as background pollutant concentrations, variable emissions, meteorological data, and traffic flows.
Assessment Scenarios	The following scenarios have been assessed: • 2024 Baseline scenario (for the purposes of model verification); and • 2028 Do Minimum scenario (inclusive of committed developments) without the Proposed Development, and 2028 Do Something scenario (Do Minimum plus the Proposed Development).
Emission Factor Toolkit (EFT)	Emission rates for NO_x, PM_{10} and $PM_{2.5}$ used in the dispersion modelling assessment were calculated from the latest EFT (v.13.1) which was released in March 2025. Most modern vehicles on the road in the UK meet a particular Euro emissions standard from 1 – 6, with 6 being the newest. Different parts of the country have newer or older vehicles than others. This is defined as the "fleet". The EFT estimates this primarily based on whether the location is within or outside London or in England, Wales, or Scotland. In the case of this model the vehicle fleet used was defined as either "England (urban)" or "England (motorway)" for the impact assessment study area. When predicting future year emissions, the toolkit includes forecasts such as anticipated advances in vehicle technology and changes in vehicle fleet composition, which assumes that vehicle emissions will reduce over time. However, there is some uncertainty over the accuracy of the future predictions.
Surface Roughness	The following surface roughness parameters have been applied in the model: • Dispersion site surface roughness = 0.5m (ADMS pre-set for 'Parkland, Open Suburbia'); and • Met site surface roughness = 1m (to reflect the 'city' nature of the meteorological station).

Model Input Parameter	Details
Meteorological Data	To calculate pollutant concentrations, ADMS-Roads requires hourly sequential meteorological data, including wind direction, wind speed, temperature, cloud cover, and stability, which exert significant influence over atmospheric dispersion. The assessment has been undertaken using 2024 meteorological data from London City Meteorological Station, which is the closest and most representative meteorological station which records the parameters necessary for dispersion modelling.
Minimum Monin-Obukhov Length	The following Minimum Monin-Obukhov (MO) lengths were applied: • Dispersion site = 30m (ADMS pre-set for 'mixed urban and industrial). • Met Site = 100m (ADMS pre-set for 'large conurbations'
Surface Albedo	0.23 (model default)
NO_x to NO_2 conversion	Ambient NO_x concentrations have been predicted through dispersion modelling. Annual NO_x concentrations have been converted using Defra's NO_x to NO_2 conversion tool version 9.1. Total NO_2 was determined by adding the calculated background NO_2 concentration to the modelled road contribution NO_x.
Background Concentrations	Defra UK-AIR modelled background concentrations for the relevant grid square and assessment years were the appropriate source of background concentrations in the dispersion modelling assessment. Annual mean background NO_2, PM_{10} and $PM_{2.5}$ concentrations were therefore derived from this dataset for 2024 and 2028.

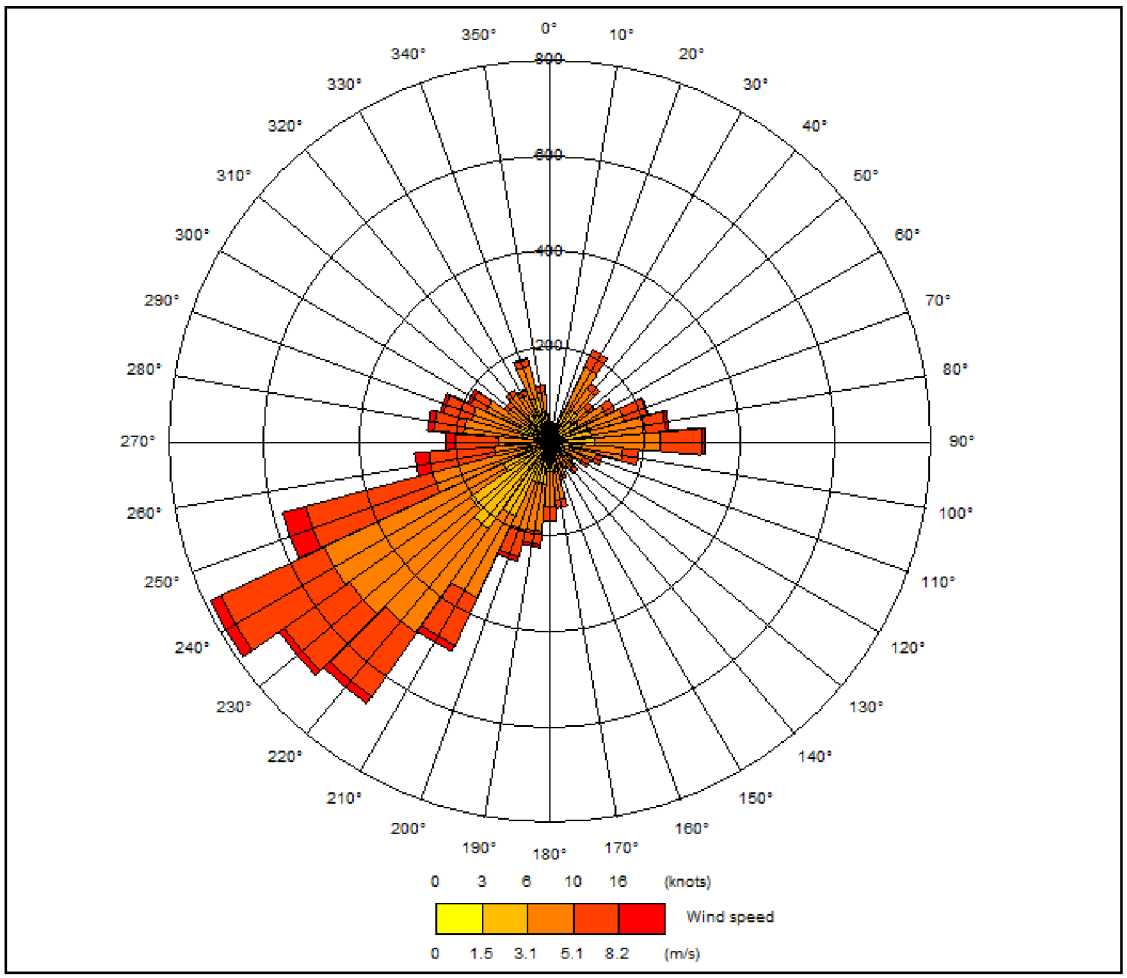

Figure 8-1: Modelled Windrose – London City 2024

Modelled Roads and Traffic Profile

Traffic data used in the ADMS modelling assessment is set out in Table 8-10. The traffic data used in the assessment was provided by (DHA Planning).

Table 8-10: Traffic Data used in ADMS Model

Location	2024 Base		2028 DM		2028 DS	
	LDV	HDV	LDV	HDV	LDV	HDV
A227 Junction with A2	222396	19265	233031	20199	233383	20205
A2 West	105722	9514	110872	9977	111099	9981
A2 East	100431	9345	105324	9800	105420	9802
A227	16243	406	16835	421	16864	422
A2 junction with Hall Road	153402	10134	160848	10641	161126	10642
Hall Road	23959	376	24875	390	24926	391
A2	129443	9758	135973	10250	136200	10251

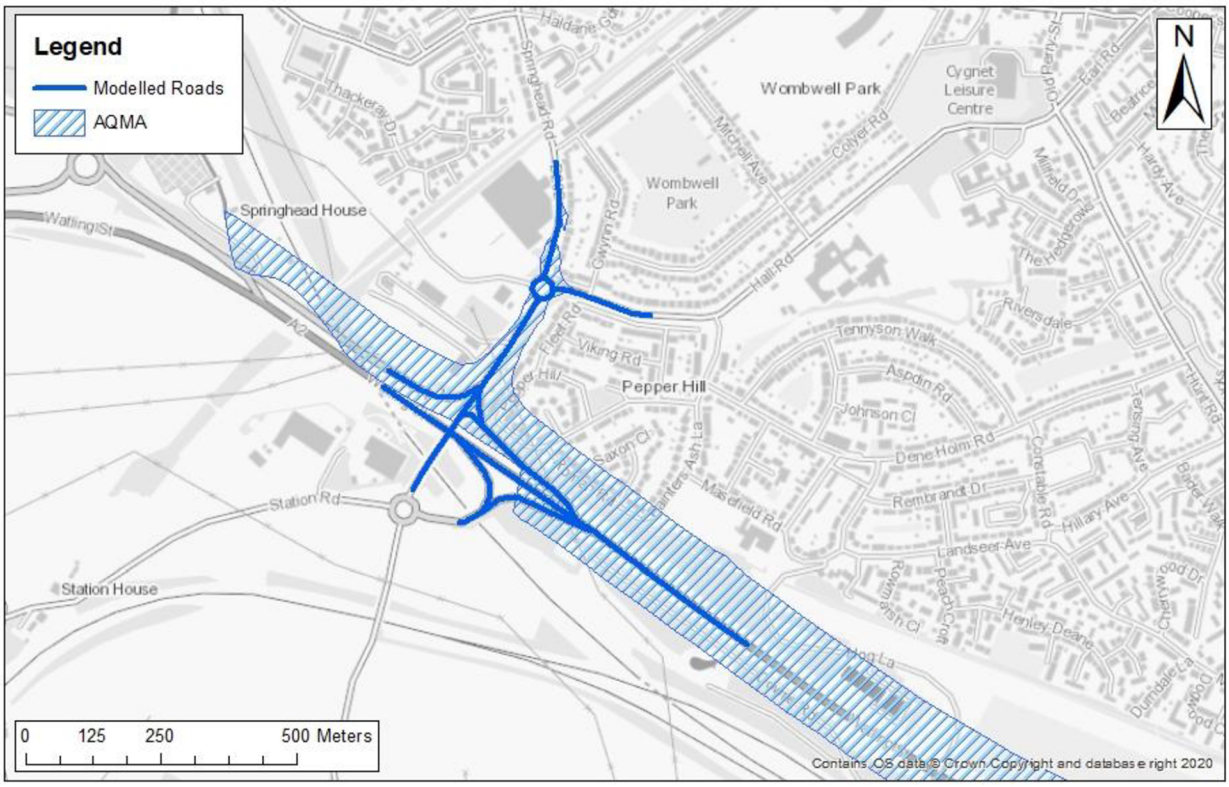

Figure 8-2: Location of Road Links used in ADMS Modelling

Model Verification

An important stage in the modelling process is model verification, which involves comparing the model output with measured concentrations to increase confidence in modelled predictions. Model verification was undertaken using 2024 diffusion tube and automatic monitoring data from GBC monitoring locations.

It is most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NO_x = NO + NO_2). The model output of road-NO_x (i.e., the component of total NO_x coming from road traffic) has been compared with the 'measured' road-NO_x.

The pre-adjusted modelled and monitored verification results are shown in Table 8-11, values have been rounded to 1 decimal place.:

Table 8-11: Modelled and Monitored Concentrations

Monitoring ID	Modelled Road-NO_x ($\mu g/m^3$)	Monitored Road-NO_x	Ratio	Modelled Total NO_2	Monitored Total NO_2	Difference
	($\mu g/m^3$)	($\mu g/m^3$)		($\mu g/m^3$)	($\mu g/m^3$)	(%)
GR 92	8.8	20.3	2.3	19.2	24.1	20
GR 107	16.0	14.0	0.9	22.4	21.5	4
GR 104	9.9	13.8	1.4	19.7	21.4	-8
GR08ABC	7.4	5.3	0.7	18.7	17.7	5
ZG2	7.4	5.1	0.7	18.7	18.6	0

As shown, modelled concentrations of NO_x and NO_2 were all within the ideal 10% of the monitored concentrations.

As such, an adjustment factor of **1.136** has been determined as the equation of the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution of NO_x, as shown below:

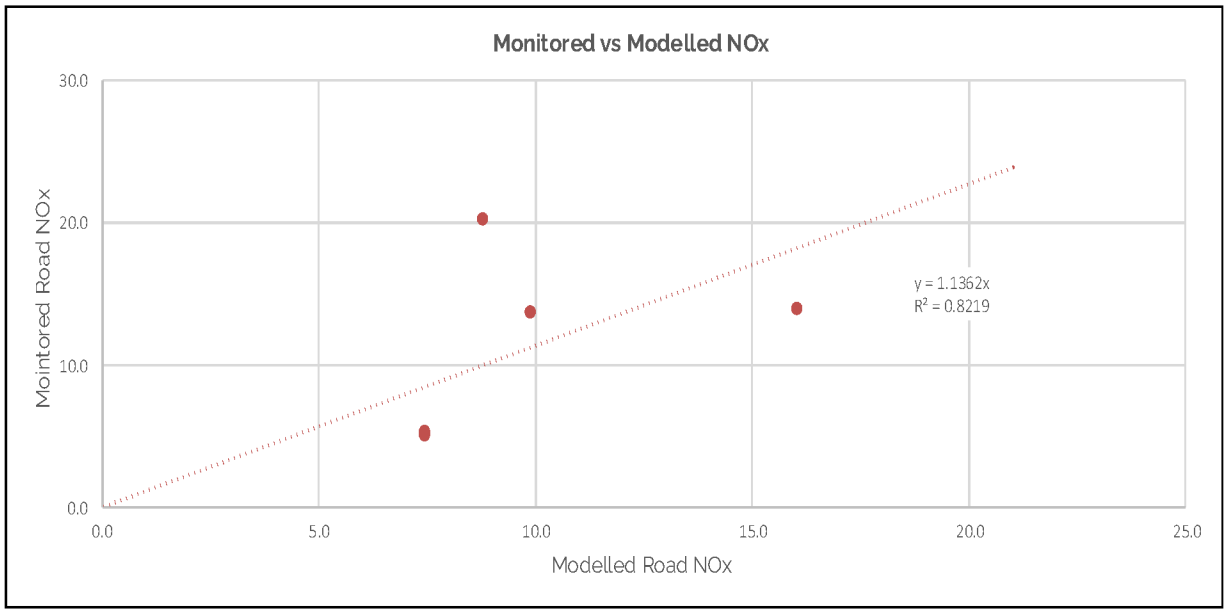

Figure 8-3: Comparison of Modelled Road-NO_x with Measured Road-NO_x

The overall pre-adjusted uncertainty (RMSE) for annual mean NO_2 was 5.9% and equates to 2.4µg/m^3.

shows total monitored versus modelled NO_2 following the adjustment of the road contribution of NO_x by this factor.

Table 8-12: Post-adjusted 2024 Modelled and Monitored Results

Monitoring ID	Adjusted Modelled NO_2	Monitored NO_2	Difference
	(µg/m^3)	(µg/m^3)	(%)
GR 92	19.76	24.1	-18
GR 107	23.26	21.5	8
GR 104	20.3	21.4	5
GR08ABC	19.1	17.7	8
ZG2	19.1	18.6	3

Following adjustment of NO_x, modelled concentrations of NO_2 were within the ideal range of +/- 10% of monitored concentrations at all monitoring locations, with the exception of GR 92, which remains in the acceptable range of 25%:

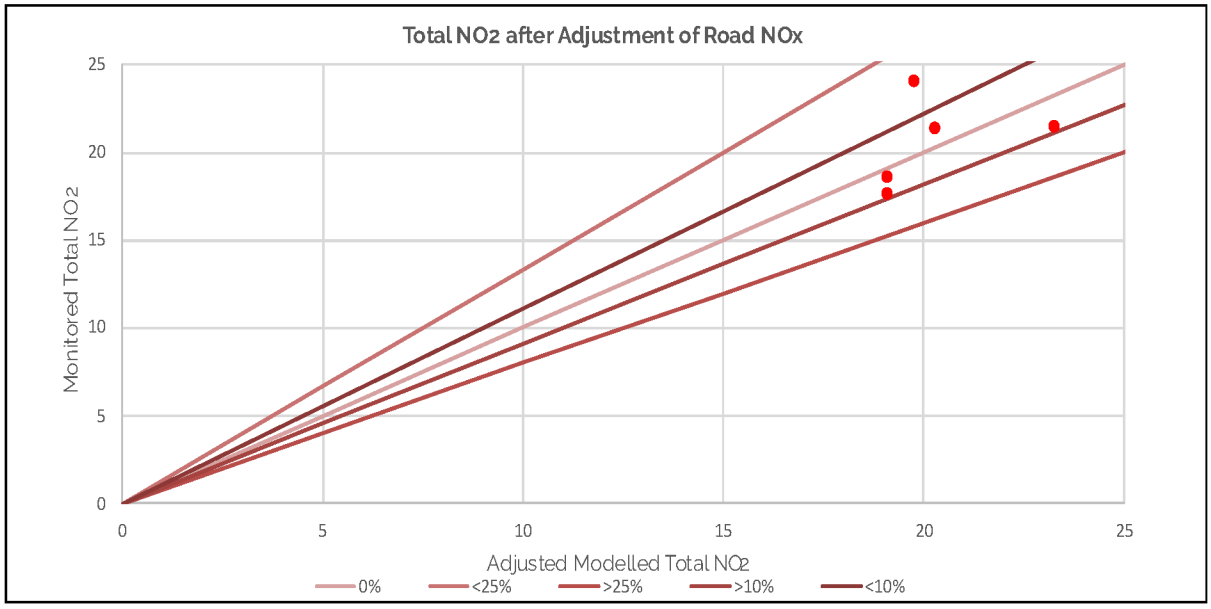

Figure 8-4: Comparison of Modelled and Monitored NO_2

In addition, the overall post-adjusted uncertainty (RMSE) for annual mean NO_2 was 5.6% and equates to 2.3µg/m^3, which is well within the acceptable range of uncertainty, in accordance with LAQM.TG (22).

Automatic monitor ZG2 also undertook monitoring of PM_{10} in 2024, as such a separate verification factor for PM_{10} has also been calculated.

Table 8-13: Post-adjusted 2024 Modelled and Monitored Results

Monitoring ID	Background PM_{10}	Monitored PM_{10}	Monitored Road PM_{10}	Modelled Road PM_{10}	Verification Factor
				(µg/m^3)	
ZG2	13.7	10.3	3.4	0.5	6.5

Considering the close relationship between PM_{10} and $PM_{2.5}$, the above verification factor has also been applied to modelled results of $PM_{2.5}$.

Appendix C: Construction Dust Mitigation

IAQM guidance provides potential mitigation measures to reduce impacts because of fugitive dust emissions during the construction phase. These have been adapted for the Site as summarised in Table 8-14.

These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the Local Authority, for example by planning condition. An example draft planning condition is presented after the table below:

Table 8-14: Fugitive Dust Emission Mitigation Measures

Issue / Control Measure	Site Risk
	Medium
H = Highly Recommended	
General	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on-site.	H
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H
Display the head or regional office contact information.	H
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 committed 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.	H
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.	H
Make the complaints log available to the Local Authority when asked.	H
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.	H

Issue / Control Measure	Site Risk Medium
H = Highly Recommended	
Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off site transport/deliveries which might be using the same strategic road network routes.	H
Monitoring	
Undertake daily on-site and offsite 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.	H
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and inspect log available to the Local Authority when asked.	H
Increase the frequency of site inspections by the person accountable for air quality and dust issues on-site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H
Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least 3 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.	H
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.	H
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on-site.	H
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.	H
Avoid site runoff of water or mud.	H
Keep site fencing, barriers and scaffolding clean using wet methods.	H
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	H
Cover, seed, or fence stockpiles to prevent wind whipping.	H
Operating Vehicle/Machinery and Sustainable Travel	

Issue / Control Measure	Site Risk Medium
H = Highly Recommended	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	H
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	H
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).	H
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials	H
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	H
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.	H
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H
Use enclosed chutes and conveyors and covered skips.	H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
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.	H
Waste Management	
Avoid bonfires and burning of waste materials.	H
Measures Specific to Earthworks	
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	H
Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	H
Only remove the cover in small areas during work and not all at once.	H

Issue / Control Measure	Site Risk Medium
H = Highly Recommended	
Measures Specific to Construction	
Avoid scabbling (roughening of concrete surfaces) if possible	H
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	H
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	H
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	H
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	H
Avoid dry sweeping of large areas	H
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport	H
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable	H
Record all inspections of haul routes and any subsequent action in a site log book.	H
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned	H
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)	H
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	H
Access gates to be located at least 10 m from receptors where possible	H