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Air Quality

Land East of Chickenhall Lane, Eastleigh

Air Quality Assessment

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Contents

Distribution List.....	2
Quality Assurance.....	2
EXECUTIVE SUMMARY.....	5
1. INTRODUCTION.....	6
1.1. Instruction.....	6
1.2. Site Location and Proposed Development.....	6
1.3. Assessment Scope and Report Amendments.....	6
1.4. Limitations.....	7
1.5. Confidentiality.....	7
2. LEGISLATION AND POLICY.....	8
2.1. Legislation.....	8
2.2. Local Air Quality Management.....	10
2.3. Dust.....	10
2.4. National Planning Policy.....	10
2.5. National Planning Practice Guidance.....	11
2.6. Local Planning Policy.....	12
3. METHODOLOGY.....	13
3.1. Introduction.....	13
3.2. Construction Phase Assessment.....	13
3.2.1. Step 1 - Screen the Need for an Assessment.....	13
3.2.2. Step 2 - Assess the Risk of Dust Impacts.....	14
3.2.3. Step 3 - Site-specific Mitigation.....	17
3.2.4. Step 4 - Determine Significant Effects.....	17
3.3. Operational Phase Assessment.....	17
3.3.1. Potential Development Impacts.....	18
3.3.2. Potential Future Exposure.....	19
4. BASELINE.....	20
4.1. Introduction.....	20
4.2. Local Air Quality Management.....	20
4.3. Air Quality Monitoring.....	20
4.4. Background Pollutant Concentrations.....	21
4.5. Sensitive Receptors.....	21
4.5.1. Construction Phase Sensitive Receptors.....	21
4.5.2. Operational Phase Sensitive Receptors.....	22
4.5.3. Industrial Emissions.....	23
5. CONSTRUCTION PHASE ASSESSMENT.....	24
5.1. Introduction.....	24
5.2. Step 1 - Screen the Need for an Assessment.....	24
5.3. Step 2a - Define the Potential Dust Emission Magnitude.....	24
5.3.1. Demolition.....	24
5.3.2. Earthworks.....	24
5.3.3. Construction.....	24
5.3.4. Track-out.....	25
5.4. Step 2b - Define the Sensitivity of the Area.....	25
5.4.1. Dust Soiling.....	25

5.4.2.	Human Health.....	25
5.4.3.	Ecological.....	25
5.5.	Step 2c - Define the Risk of Dust Impacts.....	26
5.6.	Step 3 - Site-specific Mitigation.....	26
5.7.	Step 4 - Determine Significant Effects.....	28
6.	OPERATIONAL PHASE ASSESSMENT.....	29
6.1.	Introduction.....	29
6.2.	Potential Development Impacts.....	29
6.2.1.	Predicted Concentrations.....	29
6.2.2.	Predicted Impacts.....	30
6.3.	Potential Future Exposure.....	32
6.4.	Interim Planning Guidance for PM _{2.5}	33
6.5.	Overall Impact Significance.....	34
7.	CONCLUSION.....	35

Executive Summary

Dice Environmental were commissioned by Highwood Ventures 7 Limited to undertake an Air Quality Assessment in support of a full planning application being made to Eastleigh Borough Council (EBC) relating to land east of Chickenhall Lane, Eastleigh (hereafter referred to as 'the site').

An Air Quality Assessment was undertaken to:

- Assess potential impacts associated with fugitive dust emissions during the construction phase of the proposed development;
- Assess potential impacts associated with road transport emissions during the operational phase of the proposed development;
- Assess risk of future resident exposure to any existing air quality issues; and,
- Identify any requirement for relevant mitigation measures.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of demolition, earthworks, construction and trackout activities. It is considered that the use of the identified site-specific control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the development. Additionally, future residents may be exposed to any existing air quality issues at the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

Review of the dispersion modelling results indicated that air quality impacts as a result of traffic generated by the development were not predicted to be significant at any sensitive location in the vicinity of the site.

The results of the assessment also demonstrated that predicted pollution levels were below the relevant criteria across the development. As such, the site is considered suitable for the proposed use from an air quality perspective and mitigation is not required.

Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

1. Introduction

1.1. Instruction

Dice Environmental was commissioned by Highwood Ventures 7 Limited to undertake an Air Quality Assessment in support of a full planning application being made to Eastleigh Borough Council (EBC) relating to land east of Chickenhall Lane, Eastleigh (hereafter referred to as 'the site').

1.2. Site Location and Proposed Development

The site is located on land off Chickenhall Lane, Eastleigh, at approximate National Grid Reference (NGR): 446157, 119146. The relevant Local Authority (LA) is Eastleigh Borough Council (EBC). Reference should be made to Figure 1 for a site location plan.

The proposals comprise the construction of a three-storey 70-bed care home alongside associated parking, access, bin and cycle stores, electricity substation, landscaping, drainage and other works.

1.3. Assessment Scope and Report Amendments

The proposals have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken to:

- Assess potential impacts associated with fugitive dust emissions during the construction phase of the proposed development;
- Assess potential impacts associated with road transport emissions during the operational phase of the proposed development;
- Assess risk of future resident exposure to any existing air quality issues; and,
- Identify any requirement for relevant mitigation measures.

The Air Quality Assessment was submitted to EBC on 31st December 2024. A number of comments were subsequently received from Oxana White, Pollution Control Specialist at EBC, on 31st January 2025. These were reviewed and this updated report prepared. The relevant comments and associated response are summarised in Table 1.

Table 1: Consultee Comments

Consultee Comment	Report Amendments
Among drawings of the assessment, I have not noticed any maps of the area to include receptors considered in the report, e.g. a nearby housing estate, that lays <250m that could be impacted by the construction phase. The map would also assist in identifying a large neighbouring industrial estate. There are a few operators within the area that hold an environmental permit issued by Eastleigh Borough Council (EBC) to regulate air emissions	Addressed in Figure 4
The decision not to conduct nitrogen dioxide (NO ₂) dispersion modelling, based on non-exceedance at the nearest monitoring locations, is not valid. The site is located adjacent to AQMA 1 (Eastleigh), making it necessary to conduct modelling using appropriate tools such as ADMS-Roads or similar. This is essential to properly assess potential air quality impacts and identify the significance of the impact of proposed development to the area as this AQMA spread through all central Eastleigh	Addressed in Sections 3.3 and 6.0
Additionally, the reasoning in Section 5.3 & 3.3 of the report, which screens out the assessment based on a single traffic movement difference (99 vs. 100 AADT threshold), is not a cautious approach, therefore a more conservative evaluation is required	Addressed in Section 6.2
The conclusion in the section on "Mitigation Measures" states that a Construction Environmental Management Plan (CEMP) "may be" required is not acceptable. Given the site's location near sensitive ecological receptors and the magnitude of the development, a site-specific CEMP should be a condition of approval as listed in Table 17 of the report	Addressed in Section 5.6. A Construction Environmental Management Plan (CEMP) has also been submitted in support of the application
Additionally, the assessment accounting for dust sources from the adjacent industrial estate to the users of proposed development, where several operators hold environmental permits with EBC seems to be missing	Addressed in Section 4.5.3
Also, given the proximity to industrial sources, the installation of a high-quality and appropriate ventilation system should be recommended to mitigate exposure of future users to pollutants	Addressed in Section 4.5.3 and 6.3

1.4. Limitations

All limitations of this report are presented in Appendix I.

1.5. Confidentiality

Dice Environmental has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Dice Environmental; a charge may be levied against such approval.

2. Legislation and Policy

2.1. Legislation

The Air Quality Standards Regulations (2010) [1] and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO₂)
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- Particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5});
- Benzene; and,
- Carbon monoxide.

Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for PM_{2.5} stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020) [2].

The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023 [3]. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

The Environmental Improvement Plan 2023 [4] was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to PM_{2.5}. The Concentration Target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

Table 2 presents the AQOs, Interim Target and Concentration Target for pollutants considered within this assessment.

Table 2: Air Quality Objectives/ Interim Target/ Concentration Target

Pollutant	Air Quality Objective/ Interim Target/ Concentration Target	
	Concentration ($\mu\text{g}/\text{m}^3$)	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}	12	Annual mean Interim Target to be achieved by end of January 2028
	10	Annual mean Concentration Target to be achieved by 2040

Table 3 summarises the advice provided in DEFRA guidance [5] on where AQOs for pollutants considered within this report apply.

Table 3: Examples of Where the Air Quality Objectives Apply

Averaging Period	Objectives 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 • 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
24h 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
1h 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

2.2. Local Air Quality Management

LAs are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 3, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3. Dust

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

*any dust, steam, smell or other effluvia arising on industrial, trade or business premises
and being prejudicial to health or a nuisance.*

Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

2.4. National Planning Policy

The revised National Planning Policy Framework [6] (NPPF) was published in December 2024 and 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 achievements of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives including the following of relevance to air quality:

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.

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

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

[...]

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

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

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

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

2.5. National Planning Practice Guidance

The National Planning Practice Guidance [7] (NPPG) web-based resource was launched by the Department for Communities and Local Government to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?

5. When could air quality be relevant to the planning development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.6. Local Planning Policy

The Eastleigh Borough Local Plan 2016 - 2036 [8] was adopted by EBC in April 2022. Review of the document identified the following policy of relevance to this report:

"Policy DM8, Pollution

Development will not be permitted if it is likely to cause loss of amenity or impact on public health or other unacceptable environmental impacts through:

i. air pollution (including odours or particulate emissions)

[...]

Development susceptible to particular forms of pollution will not be permitted:

a. where it will be adversely affected by such pollution, unless measures can be taken that adequately mitigate the polluting effects; or

b. where it would inhibit existing economic or other activities giving rise to acceptable polluting effects."

The above policy was considered as necessary throughout the assessment.

3. Methodology

3.1. Introduction

The proposed development has the potential to cause air quality impacts during the construction and operational phases, as well as expose future residents to elevated pollution levels. These factors have been assessed in accordance with the following methodology.

3.2. Construction Phase Assessment

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V2.2' [9].

Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and,
- Track-out.

The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM₁₀.

The assessment steps are detailed below.

3.2.1. Step 1 - Screen the Need for an Assessment

Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 250m from the boundary or 50m from the construction vehicle route up to 250m 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 up to 250m from the site entrance, then the assessment also proceeds to Step 2.

Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

3.2.2. Step 2 - Assess the Risk of Dust Impacts

Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 4.

Table 4: Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 75,000m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities more than 12m above ground level
	Earthworks	• Total site area >110,000m² • Potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >6m in height
	Construction	• Total building volume >75,000m³ • On site concrete batching • Sandblasting
	Track-out	• >50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g., high clay content) • Unpaved road length >100m
Medium	Demolition	• Total building volume between 12,000m³ and 75,000m³ • Potentially dusty construction material • Demolition activities between 6m and 12m above ground level
	Earthworks	• Total site area 18,000-110,000m² • Moderately dusty soil type (e.g., silt) • 5-10 heavy earth moving vehicles active at any one time • Formation of bunds 3-6m in height
	Construction	• Total building volume 12,000-75,000m³ • Potentially dusty construction material (e.g., concrete) • On site concrete batching
	Track-out	• 20-50 HDV trips per day • Moderately dusty surface material (e.g., high clay content) • Unpaved road length 50-100m
Small	Demolition	• Total building volume less than 12,000m³

Magnitude	Activity	Criteria
		- Construction material with low potential for dust release (e.g. metal cladding or timber) - Demolition activities less than 6m above ground - Demolition during wetter months
	Earthworks	- Total site area <18,000m² - Soil type with large grain size (e.g., sand) <5 heavy earth moving vehicles active at any one time - Formation of bunds <3m in height
	Construction	- Total building volume <12,000m³ - Construction material with low potential for dust release (e.g., metal cladding or timber)
	Track-out	<20 HDV trips per day - Surface material with low potential for dust release - Unpaved road length less than 50m

Step 2B defines the sensitivity of the area around the development to potential dust impacts. The sensitivities of specific receptors are shown in Table 5.

Table 5: Construction Dust - Sensitivities of Human and Ecological Receptors

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
Large	- Users expect 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 AQO for PM₁₀. e.g., residential properties, hospitals, schools and residential care homes	Internationally or nationally designated site e.g., Special Area of Conservation (SAC)
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 (SSSI)
Small	- 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 criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 6.

Table 6: Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number 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 7 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 7: Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Background 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
	28-32µg/m ³	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28µg/m ³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24µg/m ³	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m ³	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32µg/m ³	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28µg/m ³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24µg/m ³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table 8 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 8: Construction Dust – 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 combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

Table 9 outlines the risk category from demolition activities.

Table 9: Construction Dust - Dust Risk Category from Demolition Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Medium	Low	Negligible

Table 10 outlines the risk category from earthworks, construction and track-out activities.

Table 10: Construction Dust - Dust risk category from Earthworks, Construction and Track-out Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

3.2.3. Step 3 - Site-specific Mitigation

Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance [9] 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.

3.2.4. Step 4 - Determine Significant Effects

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 almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

3.3. Operational Phase Assessment

The development has the potential to affect air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site, as well as expose future residents to any existing air quality issues. Potential impacts have therefore been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2023 - Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2027 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2027 should the proposals be completed)

Reference should be made to Appendix V for assessment input data and details of the verification process.

3.3.1. Potential Development Impacts

Locations sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB) [10] on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance on where the AQOs apply, as summarised in Table 3, was utilised to determine worst-case receptor positions in the vicinity of links likely to be affected by changes in traffic flows as a result of the development.

The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality' [11]. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios, as outlined in Table 11.

Table 11: Significance of Operational Phase Road Vehicle Exhaust Emission Impacts

Concentration at Receptor in Assessment Year	Predicted Concentration Change as Proportion of AQO/Concentration Target (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO/Concentration Target	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO/Concentration Target	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO/Concentration Target	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO/Concentration Target	Moderate	Moderate	Substantial	Substantial
110% or more of AQO/Concentration Target	Moderate	Substantial	Substantial	Substantial

The matrix shown in Table 11 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

Following the prediction of impacts at discrete receptor locations, the IAQM document [11] provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and,

-
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts

The IAQM guidance [11] states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

The determination of significance relies on professional judgement and reasoning has been provided as far as practicable. The IAQM guidance [11] suggests the provision of details of the assessor's qualifications and experience. These may be provided upon request.

3.3.2. Potential Future Exposure

The proposals have the potential to expose future residents to any existing air quality issues. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations across the development site, detailed dispersion modelling was undertaken. The results were subsequently compared with the relevant AQOs and Concentration Target to determine any potential areas of exceedence and associated constraints to the proposed land use. Reference should be made to Appendix V for a full description of the assessment input data.

4. Baseline

4.1. Introduction

Existing air quality conditions in the vicinity of the proposed development site were identified to provide a baseline for assessment. These are detailed in the following sections.

4.2. Local Air Quality Management

As required by the Environment Act (1995), as amended by the Environment Act (2021), EBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQO within the borough. Four AQMAs have therefore been declared. The closest to the site is described as follows:

"Eastleigh AQMA No.1 (A335) - Follows the A335 Southampton Rd, Romsey Rd & Leigh Rd. Amended to extend a short way along Woodside Ave, Twyford Rd & Bishopstoke Rd. It includes a number of properties on each road."

The site is partly located within the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area, as well as exposure of future residents to elevated pollution levels. This has been considered throughout the assessment.

EBC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3. Air Quality Monitoring

Monitoring of pollutant levels is undertaken by EBC throughout their area of jurisdiction. Recent NO₂ concentrations recorded in the vicinity of the site, as reported in EBC's '2024 Air Quality Annual Status Report (ASR)' [12], are shown in Table 12.

Table 12: Monitoring Results

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)			
		2020	2021	2022	2023
BR	Bishopstoke Road	29.6	29.0	30.5	25.4
BR2	Bishopstoke Road 2	26.8	26.6	27.2	24.7

As shown in Table 12, annual mean NO₂ concentrations were below the AQO of 40µg/m³ at both monitoring locations in recent years.

Pollutant concentrations recorded during 2020 and 2021 were affected by changes to travel patterns associated with the COVID-19 pandemic. The results should therefore be viewed with

caution. However, data for 2022 and beyond is now considered representative of post-pandemic conditions. This is supported by the IAQM [13], who have adopted the following position:

"ambient air quality monitoring data for the year 2022 and beyond is generally considered to represent the current post-pandemic baseline."

Reference should be made to Figure 2 for a map of the survey positions.

EBC does not undertake monitoring of PM₁₀ or PM_{2.5} concentrations within the vicinity of the site.

4.4. Background Pollutant Concentrations

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 LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 446500, 119500. Data for this location was downloaded from the DEFRA website [14] for the purpose of the assessment and is summarised in Table 13.

Table 13 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
	2023	2025	2027
NO ₂	11.44	10.65	9.94
PM ₁₀	11.70	11.51	11.34
PM _{2.5}	7.43	7.24	7.10

As shown in Table 13, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and Concentration Target at the proposed development site.

4.5. Sensitive Receptors

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

4.5.1. Construction Phase Sensitive Receptors

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 14.

Table 14: Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	2
Up to 50	More than 100	2

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 100	More than 100	-
Up to 250	More than 100	-

Receptors sensitive to potential dust impacts from track-out were identified from a desk-top study of the area up to 50m from the road network within 250m of the site access. These are summarised in Table 15.

Table 15: Track-out Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	2
Up to 50	10 - 100	2

Dust sensitive receptors within 250m of the development site include commercial premises, an education centre and residential dwellings. These are considered to be of **medium** and **high** sensitivity. It should be noted that only receptors of **medium** sensitivity are present within 50m of the boundary.

Dust sensitive receptors up to 20m of the site access route within 250m of the site entrance of the site entrance include residential properties. These are considered to be of **high** sensitivity.

The ecological receptors identified in Table 14 and Table 15 are the River Itchen SSSI and River Itchen SAC. These cover the same geographical extents and are adjacent to the eastern site boundary. As the identified ecological receptors are a SSSI and SAC, the sensitivity was classified as **high**.

Reference should be made to Figure 3 and Figure 4 for a map of the ecological and human construction dust sensitive receptor locations, respectively.

4.5.2. Operational Phase Sensitive Receptors

Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study. These are summarised in Table 16.

Table 16: Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - Bishopstoke Road	446027.3	119168.3
R2	Residential - Bishopstoke Road	446305.7	119135.8
R3	Residential - Bishopstoke Road	446487.8	119176.0
R4	Residential - Bishopstoke Road	446553.0	119137.4
R5	Residential - Bishopstoke Road	446006.4	119188.9

Reference should be made to Figure 5 for a map of road vehicle exhaust emission sensitive receptor locations.

4.5.3. Industrial Emissions

Comments from Oxana White, Specialist Pollution Control Officer at EBC, indicated the requirement to consider the potential for air quality impacts on the proposed development as a result of emissions associated with operations at a number of environmentally permitted facilities in the vicinity of the site. A Freedom of Information Request was submitted to EBC to determine any premises within 250m of the site that operate under a Part B Environmental Permit. Those identified and associated operations are summarised in Table 17.

Table 17: Facilities with Part B Environmental Permits within 250m of the Site Boundary

Facility	Distance from Boundary (m)	Direction from Boundary	Operations
Esso Service Station	40	West	Fuel transfer from road tankers to underground storage tanks
Hants and Dorset Trim	125	South-west	Coating of road vehicles
Hi-Tech Surface Treatment Ltd	155	South	Metal coating processes
Vfs (Southampton) Ltd	220	South-west	Coating of road vehicles

As shown in Table 17, the site is located in the vicinity of four facilities that operate under a Part B Environmental Permit. No other premises were identified within 250m of the site boundary that may have the potential to cause air quality impacts at the proposed development as a result of process emissions. These findings were confirmed with Yacklin Panza, Pollution Control Specialist at EBC, on 8th May 2025. The potential for air quality impacts from the above sites are considered in the following Section.

The facilities identified in Table 17 operate under Part B Environmental Permits. As such, the operators are required to ensure effective control measures are installed to limit process emissions to air in order to comply with conditions of their Environmental Permit. Therefore, emissions from the identified facilities are adequately controlled and are not considered likely to cause air quality impacts at the proposed development. Additionally, it should be noted that in accordance with the requirements NPPF [6], the planning regime must work on the basis that the Environmental Permitting process will be effective in controlling air quality impacts in the vicinity of industrial installations. This is consistent with recent planning appeal decisions, such as that for Appeal Ref: APP/P3420/W/15/3138033.

Based on the above, the site is considered suitable for the proposed end use. As such, inclusion of mitigation measures in the form of a ventilation system would not be considered necessary as part of the proposals.

5. Construction Phase Assessment

5.1. Introduction

There is the potential for air quality impacts as a result of the construction of the proposed development. These are assessed in the following Sections.

5.2. Step 1 - Screen the Need for an Assessment

The undertaking of activities such as demolition, excavation, ground works, cutting, construction, and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements on the local road network also have the potential to result in the re-suspension of dust from highway surfaces.

The potential for impacts at sensitive locations 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.

The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 250m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

5.3. Step 2a - Define the Potential Dust Emission Magnitude

5.3.1. Demolition

Demolition will be undertaken at the start of the construction phase and will involve clearance of the existing structures on site. It is estimated that the total building volume to be demolished is less than 12,000m³. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from demolition is therefore **small**.

5.3.2. Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed development site is less than 18,000m². In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from earthworks is therefore **small**.

5.3.3. Construction

Due to the size of the development, the total building volume will be less than 12,000m³. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from construction is therefore **small**.

5.3.4. Track-out

Based on the site area, it is anticipated that the unpaved road length will be less than 50m. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from track-out is therefore **small**.

5.4. Step 2b - Define the Sensitivity of the Area

5.4.1. Dust Soiling

Table 14 shows that there is more than one **medium** sensitivity receptor within 20m of the site boundary. The sensitivity of the area with respect to dust soiling from demolition, earthworks and construction as defined using the criteria summarised in Table 6, is therefore considered to be **medium**.

Table 15 shows that there are between 10 and 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to dust soiling from track-out, as defined using the criteria summarised in Table 6, is therefore considered to be **high**.

5.4.2. Human Health

Table 13 shows the annual mean PM₁₀ background concentration at the site is 11.51µg/m³. As shown in Table 7, where the background annual mean PM₁₀ concentration is below 24µg/m³ and there are more than 10 **medium** sensitivity receptors within 20m of the site boundary, the sensitivity of the area with respect to human health from demolition, earthworks and construction is considered to be **low**.

There are between 10 and 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to human health from track-out, as defined using the criteria in Table 7, is therefore considered to be **low**.

5.4.3. Ecological

There are two ecological receptors within 20m of the site boundary. The sensitivity of these receptors with respect to ecological impacts from demolition, earthworks and construction, as defined using the criteria in Table 8, is therefore considered to be **high**.

There are two ecological receptors within 20m of the road network within 250m of the site access. The sensitivity of these receptors with respect to ecological impacts from trackout, as defined using the criteria in Table 8, is therefore considered to be **high**.

5.5. Step 2c - Define the Risk of Dust Impacts

The derived dust emission magnitude for each activity has been combined with the sensitivity of the area to determine the risk of unmitigated impacts in line with the methodology set out in Table 9 and Table 10. A summary of the risk from each dust generating activity is provided in Table 18.

Table 18: Summary of Potential Unmitigated Dust Risks

Potential Impact	Activity	Step 2A - Dust Emission Magnitude	Step 2b - Sensitivity of the Area	Step 2C - Risk
Dust Soiling	Demolition	Small	Medium	Low
	Earthworks	Small	Medium	Low
	Construction	Small	Medium	Low
	Trackout	Small	High	Low
Human Health	Demolition	Small	Low	Negligible
	Earthworks	Small	Low	Negligible
	Construction	Small	Low	Negligible
	Trackout	Small	Low	Negligible
Ecological	Demolition	Small	High	Medium
	Earthworks	Small	High	Low
	Construction	Small	High	Low
	Trackout	Small	High	Low

As indicated in Table 18, the potential risk of dust soiling is **low** from demolition, earthworks, construction and trackout. The potential risk of human health impacts is **negligible** from all activities. The potential risk of ecological impacts is **medium** from demolition and **low** from earthworks, construction and trackout.

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 the majority of the construction phase.

5.6. Step 3 - Site-specific Mitigation

The IAQM guidance [9] provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 19. These have been reviewed and incorporated into the CEMP. A final version of the document can be secured through planning condition if required by EBC.

Table 19: Fugitive Dust Emission Mitigation Measures

Issue	Control 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 boundary. 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 LA
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 LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book
Monitoring	• Carry out regular site inspections, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
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 specific operations where there is a high potential for dust production and they are active for an extensive period • Avoid site runoff of water or mud • Keep site fencing 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 • Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicle/machinery and sustainable travel	• 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
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Avoid bonfires and burning of waste materials
Construction	• Avoid scabbling (roughening of concrete surfaces), if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out

Issue	Control Measure
Track-out	• Use water-assisted dust sweeper on access and local roads, if required • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving site are covered to prevent escape of materials • Implement a wheel washing system, if required

5.7. Step 4 - Determine Significant Effects

Assuming the relevant mitigation measures outlined in Table 19 are implemented, the residual impact from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance [9].

6. Operational Phase Assessment

6.1. Introduction

The development has the potential to increase concentrations of NO₂, PM₁₀ and PM_{2.5} as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site, as well as consider potential exposure of future residents to AQO and Concentration Target exceedences.

The assessment considered the following scenarios:

- 2023 - Verification;
- 2027 - DM; and,
- 2027 - DS.

The DM scenario (i.e. without development) included baseline traffic data, inclusive of anticipated growth and committed developments, for the relevant assessment year. The DS scenario (i.e. with development) included baseline traffic data, inclusive of anticipated growth and committed developments, in addition to predicted vehicle trips associated with the operation of the proposals.

For the purpose of the assessment traffic data for 2027 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emissions factors and background concentrations for 2023 were utilised within the dispersion model. The use of 2027 traffic data and 2023 emission factors is considered to provide a robust scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

Reference should be made to Appendix V for full assessment input details.

6.2. Potential Development Impacts

6.2.1. Predicted Concentrations

Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 20.

Table 20: Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bishopstoke Road	24.18	24.22	0.04
R2	Residential - Bishopstoke Road	15.67	15.69	0.02

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R3	Residential - Bishopstoke Road	23.94	23.99	0.05
R4	Residential - Bishopstoke Road	18.37	18.40	0.03
R5	Residential - Bishopstoke Road	19.27	19.30	0.03

As indicated in Table 20, predicted annual mean NO₂ concentrations were below the AQO of 40µg/m³ at all sensitive receptors in both scenarios.

Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 21.

Table 21: Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bishopstoke Road	15.88	15.89	0.02
R2	Residential - Bishopstoke Road	13.00	13.00	0.01
R3	Residential - Bishopstoke Road	16.01	16.03	0.02
R4	Residential - Bishopstoke Road	13.97	13.98	0.01
R5	Residential - Bishopstoke Road	14.16	14.17	0.01

As indicated in Table 21, predicted annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ at all sensitive receptors in both scenarios.

Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 22.

Table 22: Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bishopstoke Road	9.70	9.71	0.01
R2	Residential - Bishopstoke Road	8.13	8.14	0.00
R3	Residential - Bishopstoke Road	9.75	9.76	0.01
R4	Residential - Bishopstoke Road	8.66	8.66	0.01
R5	Residential - Bishopstoke Road	8.77	8.78	0.00

As indicated in Table 22, predicted annual mean PM_{2.5} concentrations were below the Concentration Target of 10µg/m³ at all sensitive receptors in both scenarios.

6.2.2. Predicted Impacts

Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 23.

Table 23: Predicted Impacts - NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible
R2	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible
R3	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible
R4	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible
R5	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible

As indicated in Table 23, impacts on annual mean NO₂ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

Predicted impacts on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 24.

Table 24: Predicted Impacts - PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible
R2	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible
R3	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible
R4	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible
R5	Residential - Bishopstoke Road	Below 75% of AQO	0	Negligible

As indicated in Table 24, impacts on annual mean PM₁₀ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

Predicted impacts on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 25.

Table 25: Predicted Impacts - PM_{2.5}

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of Concentration Target (%)	Impact Significance
R1	Residential - Bishopstoke Road	95 - 102% of Concentration Target	0	Negligible
R2	Residential - Bishopstoke Road	76 - 94% of Concentration Target	0	Negligible
R3	Residential - Bishopstoke Road	95 - 102% of Concentration Target	0	Negligible
R4	Residential - Bishopstoke Road	76 - 94% of Concentration Target	0	Negligible
R5	Residential - Bishopstoke Road	76 - 94% of Concentration Target	0	Negligible

As indicated in Table 25, impacts on annual mean PM_{2.5} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

6.3. Potential Future Exposure

The proposals have the potential to expose future residents to elevated pollution levels as a result of road vehicle exhaust emissions in the vicinity of the site. Dispersion modelling was therefore undertaken with the inputs described in Appendix V to quantify air quality conditions across the development. Reference should be made to Figures 6, 7 and 8 for graphical representations of predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations.

As shown in Figure 6, annual mean NO₂ concentrations were predicted to be below the AQO of 40µg/m³ across the development. The maximum level was 25.31µg/m³.

As shown in Figure 7, annual mean PM₁₀ concentrations were predicted to be below the AQO of 40µg/m³ across the development. The maximum level was 15.76µg/m³.

As shown in Figure 8, annual mean PM_{2.5} concentrations were predicted to be below the Concentration Target of 10µg/m³ across the development. The maximum level was 9.66µg/m³.

Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the relevant AQOs and Concentration Target. As such, the site is considered suitable for the proposed use from an air quality perspective and there is no requirement for mitigation measures.

6.4. Interim Planning Guidance for PM_{2.5}

Interim Planning Guidance [15] on the consideration of the PM_{2.5} targets identified in the Environment Act (2021) in planning decisions has been produced by DEFRA. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise PM_{2.5} and its precursors as far as is reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in Table 26, along with the development response.

Table 26: Interim Planning Guidance Questions

Question	Response
How has exposure to PM_{2.5} been considered when selecting the development site? • Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these • Site proximity to pollution sources and the impact of these on users of the development • Exposure and emissions during both construction and in-use	There are no schools, hospitals or care homes within the immediate vicinity of the site. Receptors located along the wider road network have the potential to be affected by road vehicle exhaust emissions associated with vehicles travelling to and from the site. However, the findings of the assessment, as previously summarised, indicate that impacts on PM_{2.5} concentrations are predicted to be not significant. Levels were also predicted to be below the Concentration Target at all sensitive receptors The site is located adjacent to Bishopstoke Road. The assessment has considered the potential for exposure of future residents to elevated pollutant levels. As shown in Section 6.3, PM_{2.5} levels across the site were predicted to be below the Concentration Target to be achieved by 2040 As outlined in Table 19, a number of mitigation measures will be used throughout the construction phase in order to reduce fugitive dust emissions as far as practicable. This will control potential exposure at off-site locations
What actions and/or mitigations have been considered to reduce PM_{2.5} exposure for development users and nearby receptors (houses, hospitals, schools etc.) and to reduce emissions of PM_{2.5} and its precursors? • Site layout • The development's design • Technology used in the construction or installed for use in the development • Construction and future use of the development	Development users are not predicted to be exposed to PM_{2.5} concentrations above the Concentration Target In order to reduce emissions of PM_{2.5} with associated impacts at nearby receptors the following measures will be included in the development: • 12 secure cycle parking spaces • Pedestrian links to encourage the use of sustainable transport modes to and from the site • Implementation of a Travel Plan Further to the above, in order to reduce emissions during the construction phase, a number of mitigation measures will be used to minimise dust generation from associated activities. These are summarised in Table 19

Based on the responses provided in Table 26 and the assessment results, as outlined in Sections 5 and 6, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of PM_{2.5}.

6.5. Overall Impact Significance

The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the overall predicted impacts at discrete receptor locations and the considerations outlined previously. Further justification is provided in Table 27.

Table 27: Overall Impact Significance of Road Vehicle Exhaust Emissions Impacts

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations were below the relevant AQOs and Concentration Target at all locations in the DM scenario It is considered unlikely that future air quality conditions will change significantly in the absence of the development given the relatively established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs or Concentration Target
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	It was assumed that vehicle exhaust emission rates and background concentrations will not reduce in future years. This provides conservative results when compared with DEFRA and National Highways methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

The IAQM guidance [11] states that only if the impact is greater than **slight**, the effect is considered significant. As impacts were predicted to be **negligible**, overall effects are considered **not significant**, in accordance with the stated methodology.

7. Conclusion

Dice Environmental was commissioned by Highwood Ventures 7 Limited to undertake an Air Quality Assessment in support of a full planning application being made to Eastleigh Borough Council (EBC) relating to land east of Chickenhall Lane, Eastleigh (hereafter referred to as 'the site').

The development may lead to adverse air quality impacts at sensitive locations during the construction and operational phases, as well as the exposure of future residents to any existing air quality issues at the site. As such, an Air Quality Assessment was undertaken to determine baseline conditions, consider location suitability for the proposed end-use and assess potential effects associated with the scheme.

During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Site-specific dust control measures were subsequently determined. Following implementation, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and track-out activities are predicted to be **not significant**.

Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the development. Additionally, future residents may be exposed to any existing air quality issues at the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

Review of the dispersion modelling results indicated that impacts on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations as a result of traffic generated by the development were predicted to be **negligible** at all receptor locations.

The results of the dispersion modelling assessment also indicated that predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations were below the relevant AQOs and Concentration Target across the development. The site is therefore considered suitable for the proposed use from an air quality perspective and mitigation is not required.

Following consideration of the relevant issues, residual impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.

Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

Appendix I - Limitations

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Dice Environmental and the Client as indicated in Section 1.2.
2. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
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4. Where a noise survey is required to inform the assessment, Dice Environmental will endeavour to ensure that all noise measurements taken are robust, representative and reliable in order to inform an accurate noise impact assessment. Where limitations or constraints exist which prevent a suitable noise survey being completed, Dice Environmental will take all reasonable steps to make the client fully aware of any such limitations or constraints with a view to achieving the best possible outcome for the client. Where additional sound surveys are required, over and above those specified in our scope of works, then Dice Environmental reserves the right to charge additional fees.
5. Where mitigation measures are specified in our report, it should be noted that these measures are relative to a specific sound source, both in terms of the measured sound pressure level and the character of the source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, Dice Environmental cannot be held responsible for any subsequent variations in the proposed mitigation performance.

Appendix II - Glossary of Abbreviations

Table A1: Acronyms

Acronym	Definition
AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
ASR	Annual Status Report
CEMP	Construction Environmental Management Plan
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EBC	Eastleigh Borough Council
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
SP	Slow Phase
Z ₀	Roughness length

Appendix III - Figures

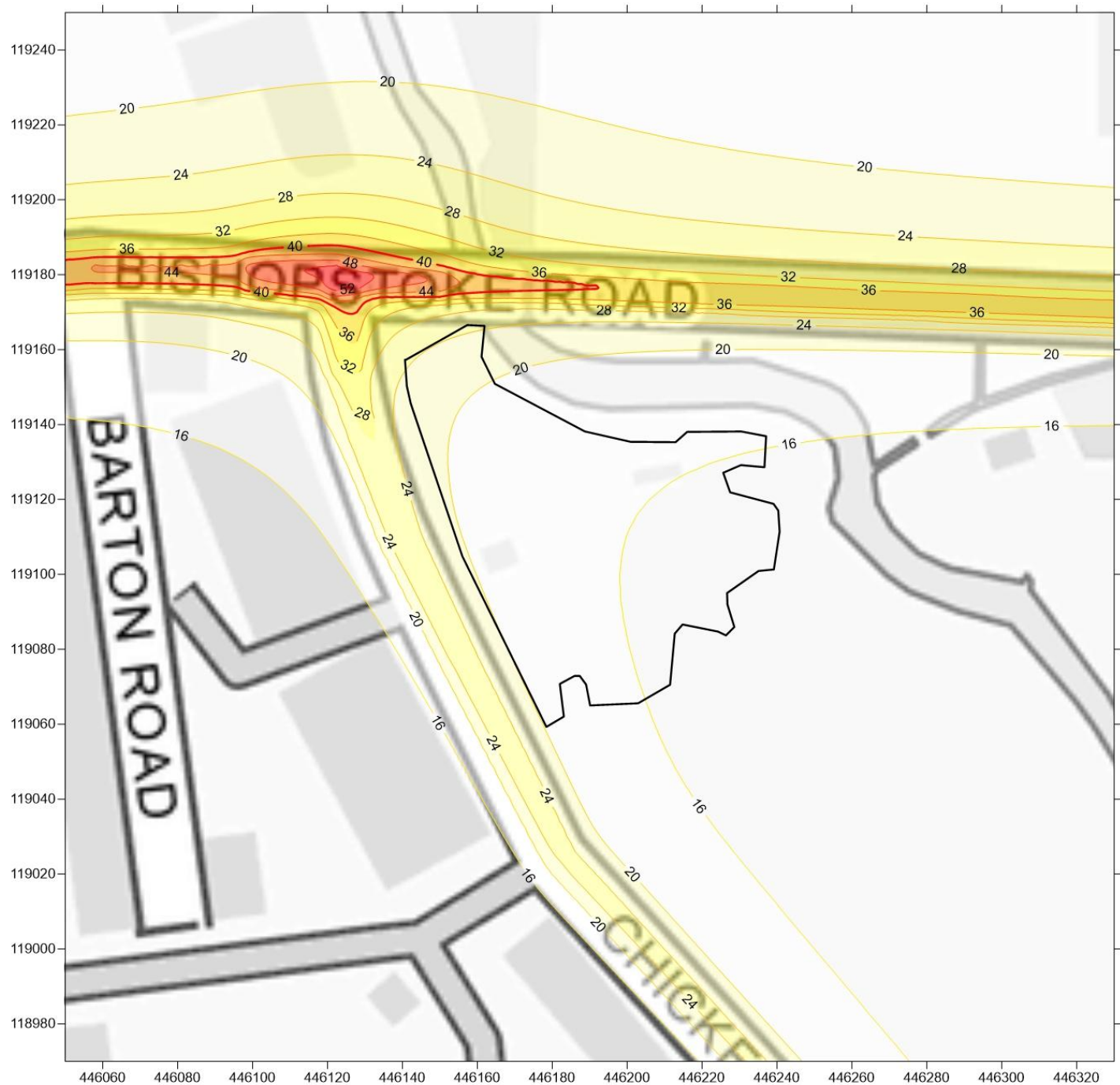




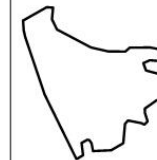




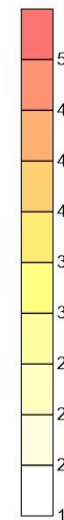




Legend



Site Boundary



Annual Mean
NO₂
Concentration (µg/m³)

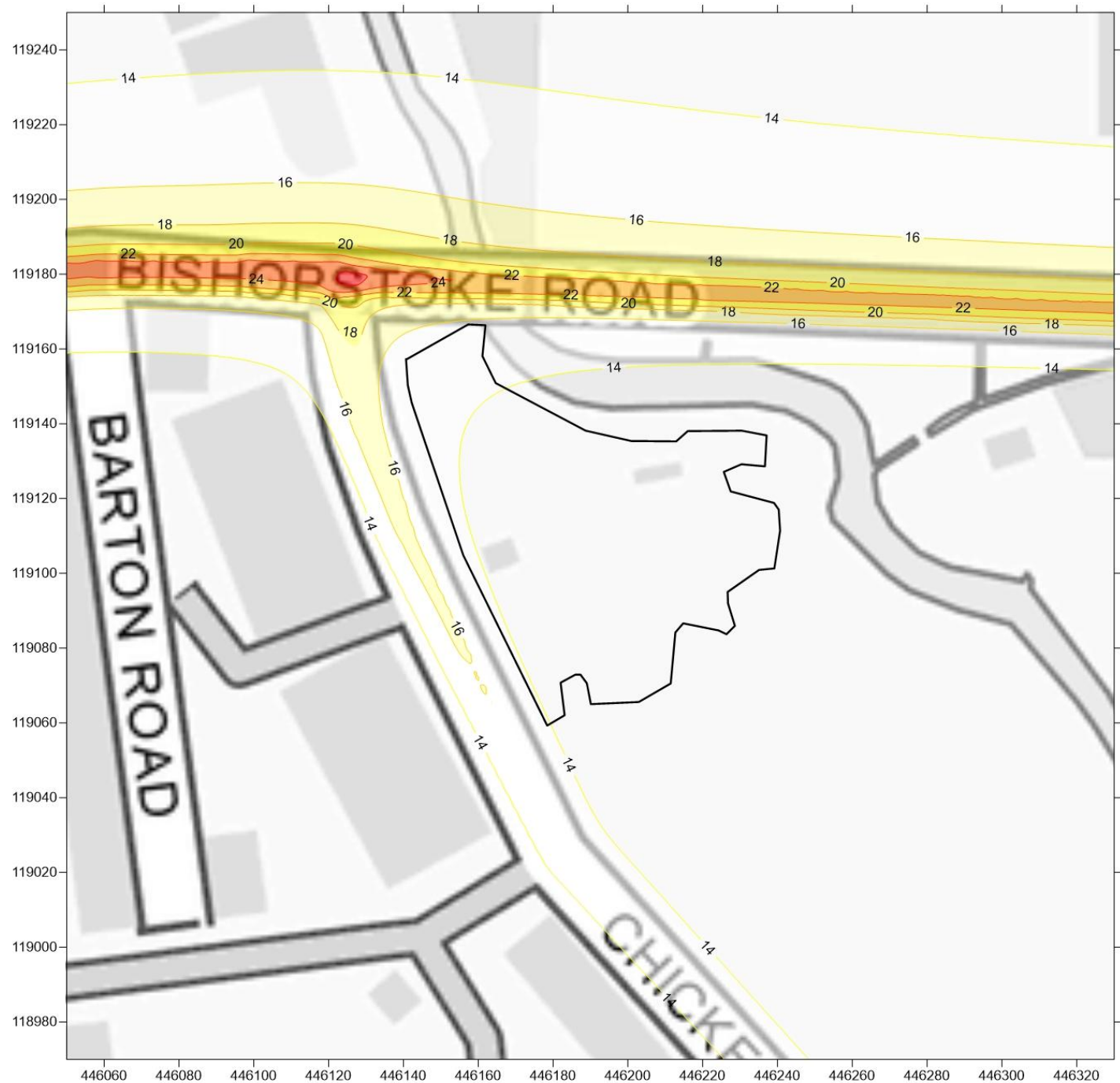
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Figure 6 - Predicted Annual Mean
NO₂ Concentrations (µg/m³)
Do-Something

Project

Air Quality Assessment
Chickenhall Lane, Eastleigh

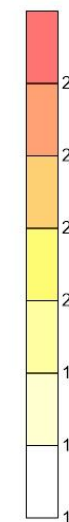
Contains Ordnance Survey Data
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Legend



Site Boundary



Annual Mean
PM₁₀
Concentration
(µg/m³)

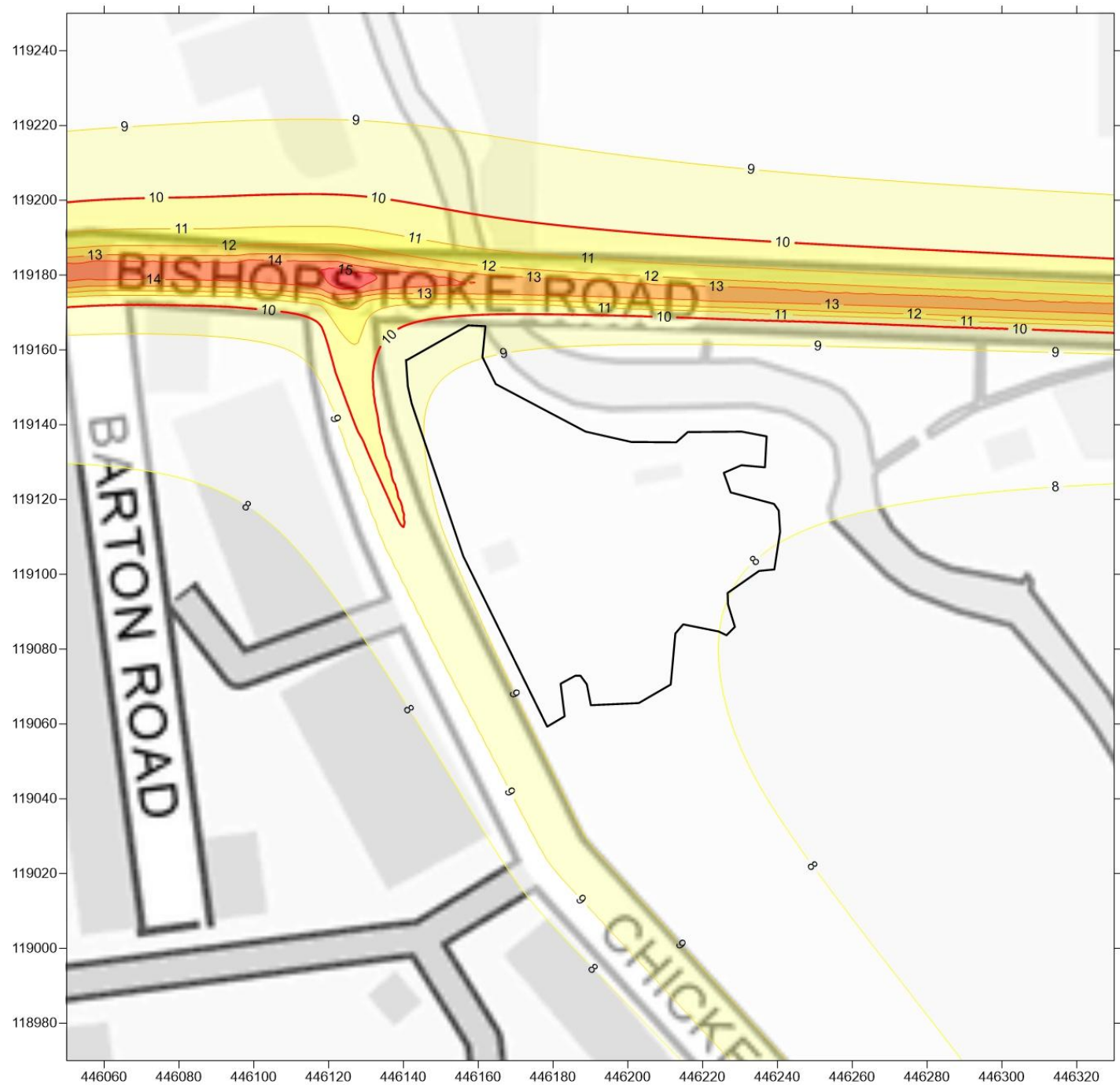
Title

Figure 7 - Predicted Annual Mean
PM₁₀ Concentrations (µg/m³)
Do-Something

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Legend



Site Boundary



Annual Mean
PM_{2.5}
Concentration
(µg/m³)

Title

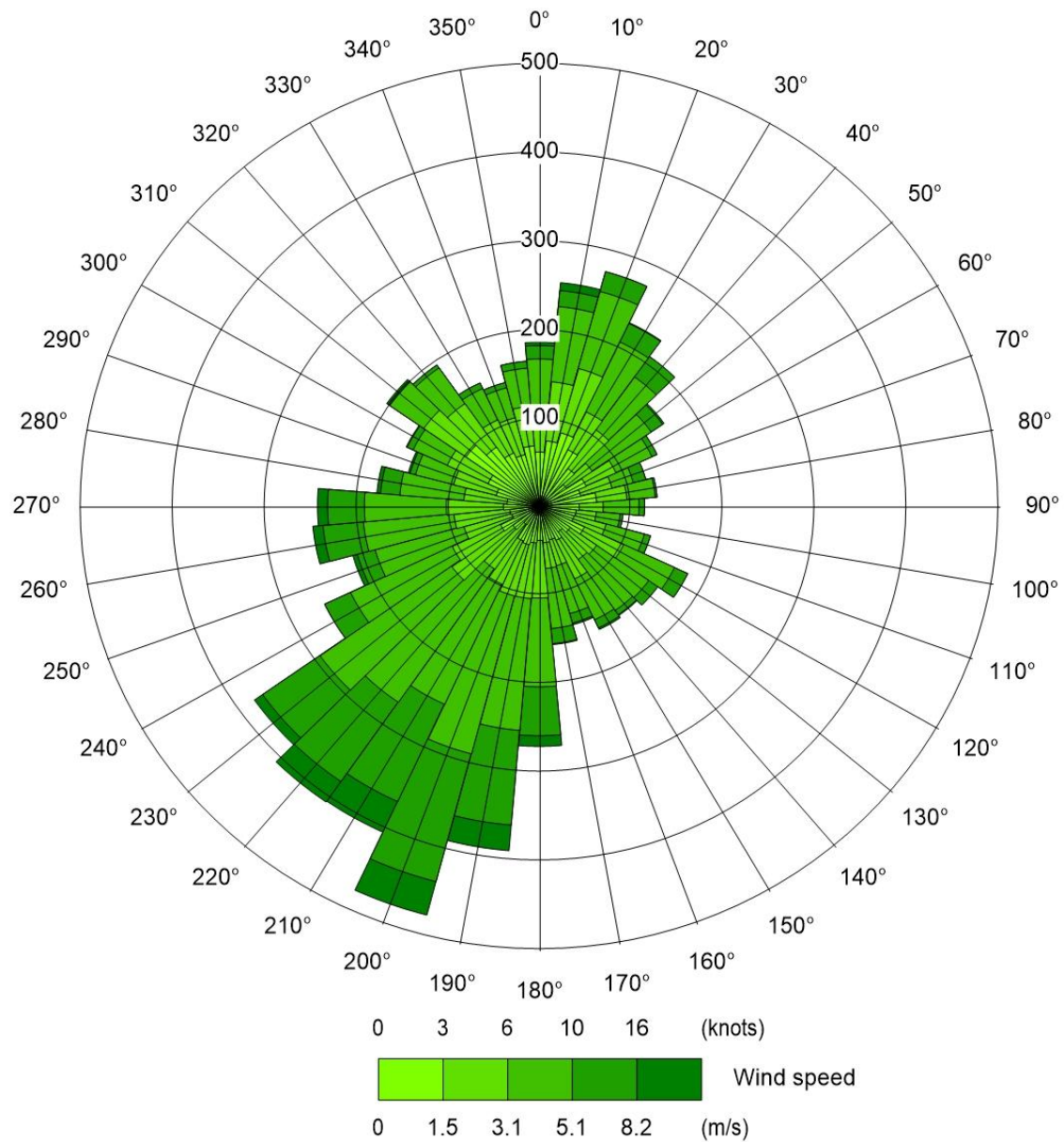
Figure 8 - Predicted Annual Mean
PM_{2.5} Concentrations (µg/m³)
Do-Something

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Title

Figure 10 - Wind Rose of 2023
Southampton Meteorological Data

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Appendix IV - Bibliography

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Appendix V - Assessment Input Data

Introduction

The proposals have the potential to cause air quality impacts as a result of exhaust emissions associated with vehicles travelling to and from the development, as well as expose future residents to any existing air quality issues at the site. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Dispersion Model

Dispersion modelling was undertaken in order to predict NO₂, PM₁₀ and PM_{2.5} concentrations across the site using the ADMS-Roads dispersion model (version 5.0.1.3). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Meteorological Data;
- Roughness Length (z_0); and,
- Monin-Obukhov Length.

The relevant inputs are detailed in the following Sections.

Assessment Area

Ambient concentrations were predicted over the area NGR: 446050, 118970 to 446330, 119250. One Cartesian grid was included within the model to produce data suitable for contour plotting using the Surfer software package.

Receptors potentially sensitive to changes in pollutant concentrations were included in the assessment as outlined in the main report text.

Reference should be made to Figure 9 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Baseline traffic data for use in the assessment was obtained from the Air Quality Chapter of the Environmental Statement produced in support of the Material Recycling Facility (planning reference: CS/22/92463) located approximately 800m to the south of the site.

The baseline traffic data was converted to the site opening year utilising a factor obtained from TEMPro (version 8.0). This software package has been developed by the Department for Transport (DfT) to calculate future traffic growth throughout the UK.

The total number of daily vehicle movements generated by the proposals and associated distribution on the local road network was provided by the Transport Consultants for the project. These were added to the relevant links to establish the DS scenario.

In order to take account of cumulative air quality impacts on the local road network, vehicle movements associated with the Material Recycling Facility (planning reference: CS/22/92463) were included in both the DM and DS scenarios.

Road parameters for input into the model were based on the following:

- Road widths were estimated from aerial photography and UK highway design standards;
- Vehicle speeds were estimated as an average for the relevant road link over the course of a 24-hour period;
- Vehicle speeds were determined following review of speed limits within the study extents, as well as congestion data available from GoogleMaps;
- Vehicle speeds specific to slow phases were determined using the methodology outlined in the DEFRA guidance [5];
- Necessary adjustments to slow phase vehicle speeds were based upon congestion data available from GoogleMaps; and,
- The length for slow phases were derived using the approaching distance of 25m outlined in the DEFRA guidance [5], and adjusted accordingly based on aerial photography and congestion data available from GoogleMaps.

A summary of the traffic data used in the assessment is provided in Table A2.

Table A2: Traffic Data

Link		24-hour AADT Flow			HDV. Prop. Of Fleet (%)		Road Width (m)	Avg. Vehicle Speed (km/h)
		2023	2027 DM	2027 DS	2023	2027		
L1	Chicken Hall Lane, South of Site Access	6,318	6,706	6,805	21.53	22.64	8.6	40

L2	Chicken Hall Lane, North of Site Access	6,318	6,706	6,805	21.53	22.64	8.8	40
L3	Chicken Hall Lane, Slow Phase (SP)	6,318	6,706	6,805	21.53	22.64	9.5	20
L4	Bishopstoke Road, East of Chickenhall Lane, SP	24,062	24,710	24,809	3.30	3.38	6.8	20
L5	Bishopstoke Road, East of Chickenhall Lane	24,062	24,710	24,809	3.30	3.38	6.4	45
L6	Bishopstoke Road, West of Chickenhall Lane, SP	27,930	28,684	28,783	7.57	7.90	9.6	20
L7	Bishopstoke Road, West of Chickenhall Lane	27,930	28,684	28,783	7.57	7.90	8.1	45

Reference should be made to Figure 9 for a graphical representation of the road link locations.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 13.1). This has been produced by DEFRA and incorporates COPERT 5.8 vehicle emission factors and fleet information.

There is current uncertainty over NO₂ concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2023 emission factors were utilised in preference to the scheme opening year in order to provide robust model outputs. As predictions for 2023 were verified, it is considered the results are a robust indication of concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Southampton Airport meteorological station over the period 1st January 2023 to 31st December 2023 (inclusive). Southampton Airport is located at NGR: 444992, 116764, which is approximately 2.6km south-west of the site. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 10 for a wind rose of utilised meteorological data.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the morphology of both areas and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 10m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'small towns < 50,000'.

Background Concentrations

Annual mean NO₂, PM₁₀ and PM_{2.5} background concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the development site, as shown in Table 13.

Similarly to emission factors, background concentrations from 2023 were utilised in preference to the future year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 9.1) provided by DEFRA, which is the method detailed within DEFRA guidance [5].

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of the assessment, model verification was undertaken for 2023 using traffic data, meteorological data and monitoring results from this year.

Monitoring of NO₂ concentrations was undertaken at two locations within the vicinity of the roads included in the dispersion model during 2023. The results were obtained and the road contributions

to total NO_x concentrations calculated following the methodology contained within DEFRA guidance [5]. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A3.

Table A3: NO_x Verification - Monitoring Results

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
BR	Bishopstoke Road	25.4	32.48
BR2	Bishopstoke Road 2	24.7	30.65

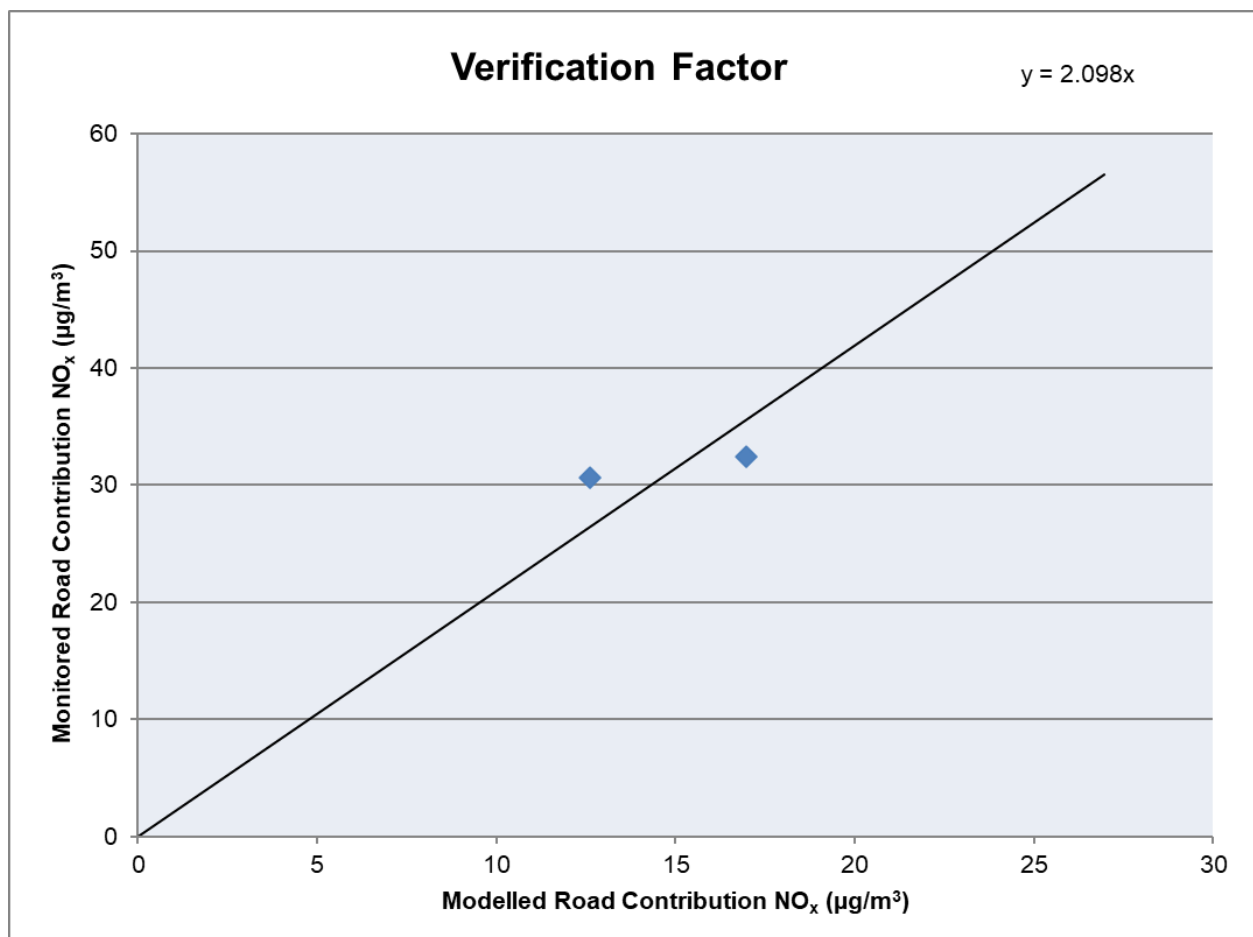
The annual mean road NO_x concentrations predicted from the dispersion model and the 2023 road NO_x concentrations calculated from the monitoring results are summarised in Table A4.

Table A4: NO_x Verification - Modelling Results

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
BR	Bishopstoke Road	32.48	16.97
BR2	Bishopstoke Road 2	30.65	12.61

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 2.098 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

Graph 1: NO_x Verification Factor



Monitoring of PM₁₀ or PM_{2.5} concentrations was not undertaken within the assessment extents. The NO₂ verification factor was therefore used to adjust model predictions of these species in lieu of more accurate data in accordance with DEFRA guidance [5].