
FOCUS CONSULTANTS 2010 LLP

AIR QUALITY ASSESSMENT

BOWLS CLUB, GRAVESEND DA12 2QU

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CONTENTS

1	INTRODUCTION	4
2	LEGISLATION AND POLICY	6
3	SCOPE AND METHODOLOGY	13
4	BASELINE	17
5	ASSESSMENT	19
6	MITIGATION AND RESIDUAL EFFECTS	28
7	SUMMARY AND CONCLUSIONS	32

FIGURES

Figure 1 Site Location	35
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APPENDICES

FIGURES

APPENDIX A - REPORT LIMITATIONS

APPENDIX B – GLOSSARY

APPENDIX C – IAQM CONSTRUCTION DUST ASSESSMENT METHODOLOGY

IAQM CONSTRUCTION DUST ASSESSMENT METHODOLOGY

1 INTRODUCTION

1.1.1 By instruction from Focus Consultants 2010 LLP, NoiseAir Limited was commissioned to undertake an Air Quality Assessment (AQA) in support of a proposed planning application to construct a retirement village at Bowls Club, Gravesend DA12 2QU, herein referred to as 'the Site'.

1.1.2 Limitations of this report are outlined in **Appendix A**.

1.2 Site Location and Context

1.2.1 The Site is located at Bowls Club, Gravesend, Gravesham, Kent DA12 2QU at approximate National Grid Reference (NGR): 565805, 173750. **Figure 1** details the location of the Proposed Development Site.

1.2.2 The Site is located in an area where air quality is mainly influenced by road traffic emissions along the local road and network and as such, elevated pollutant concentrations may be experienced at and around this location. Subsequently, the development may lead to adverse impacts at nearby sensitive receptors, as a result of fugitive dust emissions during construction and road vehicle exhaust emissions during operation. As such, an Air Quality Assessment is required to determine potential impacts associated with the proposed development in accordance with the requirements of The National Planning Policy Framework (NPPF). The air quality assessment will therefore consider ambient pollutant concentrations namely nitrogen dioxide (NO₂) and particulate matter (PM₁₀) around the Site.

1.2.3 The main potential sources of air pollution were identified as emissions from road transport using the local road and network. There are no combustion sources identified within the immediate vicinity of the Site that will influence the local air quality.

1.2.4 The proposed development is located within the jurisdiction of Gravesham Borough Council (GBC). The development Site is situated in a predominantly residential area in Gravesend, Kent. The Site is bounded by Church Walk to the west, Milton Road (A226) to the north, further recreational area from the south, and by Ellerslie to the east.

1.2.5 The proposals comprise the demolition of the currently out of use bowling field and its associated facilities and the construction of a retirement village over three floors with associated car parks and landscaping.

1.2.6 The report presents the findings of an assessment of the potential air quality impacts of the Proposed Development during the construction and operational phases. For both phases,

the type of source under significance of potential impacts are identified, and measures that should be employed to minimise these are described.

2 LEGISLATION AND POLICY

2.1 Air Quality Legislation and Policy

2.1.1 A summary of the relevant air quality legislation and policy is provided below.

UK Air Quality Strategy

2.1.2 The government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)¹. The AQS provides a framework for reducing air pollution in the UK with the aim of meeting the requirements of European Union Legislation.

2.1.3 The AQS also sets standards and objectives for nine key pollutants to protect health, vegetation and ecosystems. These are benzene (C₆H₆), 1,3 butadiene (C₄H₆), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), particulate matter (PM₁₀ and PM_{2.5}), sulphur dioxide (SO₂), ozone (O₃), and polycyclic aromatic hydrocarbons (PAHs).

2.1.4 The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organization (WHO) with regards to current scientific knowledge and the effects of each pollutant on health and the environment.

2.1.5 The Air Quality Objectives (AQOs) are medium-term policy-based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to EPAQS recommended standards or WHO guideline limits, whereas other involve a margin of tolerance, i.e. a limited number of permitted exceedances of standards over a given period.

2.1.6 **Table 1** presents the AQOs for pollutants considered within this assessment.

Table 1: National Air Quality Objectives and European Directive Limit Values for the Protection of Human Health			
Pollutant	Applies to	Objective	Measured As
NO ₂	UK	40µg/m ³	Annual mean
	UK	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
PM ₁₀	UK (except Scotland)	40µg/m ³	Annual mean
	UK (except Scotland)	50µg/m ³ not to be exceeded more than 35 times a year	24-hour mean

¹ Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2).

- 2.1.7 For the pollutants considered in this assessment, there are both long-term (annual mean) and short-term standards. In the case of NO₂, the short-term standard is for a 1-hour averaging period, whereas for PM₁₀ it is a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants, for example temporary exposure on the pavement adjacent to a busy road compared with the exposure of residential properties adjacent to a road.

Air Quality Regulations (2016)

- 2.1.8 Many of the objectives in the AQS have been made statutory in England with the Air Quality (England) Regulations 2000² and the Air Quality (England) (Amendment) Regulations 2002³ for the purpose of Local Air Quality Management (LAQM).

- 2.1.9 These Regulations require that likely exceedances of the AQS objectives are assessed in relation to:

[...] the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present [...]

- 2.1.10 The Air Quality Standards (Amendment) Regulations 2016⁴ amends the Air Quality Standards Regulations 2010 that transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as PM₁₀, PM_{2.5} and NO₂. The limit values for NO₂ and PM₁₀ are the same concentration levels as the relevant AQS objectives and the limit value for PM_{2.5} is a concentration of 25µg/m³.

Environmental Protection Act 1990 – Control of Dust and Particles Associated with Construction

- 2.1.11 Section 79 of the Environmental Protection Act 1990⁵ gives the following definitions of statutory nuisance relevant to dust and particles:

'Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health or a nuisance'; and

² The Air Quality (England) Regulations 2000 – Statutory Instrument 2000 No.928.

³ The Air Quality (England) (Amendment) Regulations 2002 – Statutory Instrument 2002 No.3043.

⁴ The Air Quality Standards (Amendment) Regulations 2016 - Statutory Instrument 2016 No. 1184.

⁵ Environmental Protection Act. London 1990. HMSO

'Any accumulation or deposit which is prejudicial to health or a nuisance'.

- 2.1.12 Following this, Section 80 says that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.
- 2.1.13 There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist. Nuisance is a subjective concept, and its perception is highly dependent upon the existing conditions and the change which has occurred.

Environment Act 1995

- 2.1.14 Under Part IV of the Environment Act 1995⁶, local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the air quality objectives defined in the Regulations. Where the objectives are not likely to be achieved, an authority is required to designate an Air Quality Management Area (AQMA). For each AQMA the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it intends to work towards achieving air quality standards in the future.

Clean Air Strategy (2019)

- 2.1.15 In 2019, the UK government released its Clean Air Strategy 2019⁷, part of its 25 Year Environment Plan⁸. The Strategy sets out the comprehensive action that is considered to be required from across all parts of government and society.
- 2.1.16 The primary focus of air quality management has primarily related to NO₂, and its principal source in the UK, road traffic. The 2019 Strategy aims to broaden the focus to other areas, including actions on clean growth, and emissions from domestic wood burning stoves, industry and agriculture.

2.2 Planning Policy

- 2.2.1 A summary of the national and local planning policy relevant to the Proposed Development and air quality is provided below.

⁶ Environment Act 1995. London HMSO

⁷ Department for Environment, Food and Rural Affairs (2019) Clean Air Strategy 2019.

⁸ Department for Environment Food and Rural Affairs (Defra) (2018) A Green Future: Our 25 Year Plan to Improve the Environment.

National Planning Policy Framework (2021)

2.2.2 The Government's overall planning policies for England are described in the National Planning Policy Framework⁹. The core underpinning principle of the Framework is the presumption in favour of sustainable development, defined as:

'[...] meeting the needs of the present without compromising the ability of future generations to meet their own needs.'

2.2.3 One of the three overarching objectives of the NPPF is that planning should 'contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'

2.2.4 In relation to air quality, the following paragraphs in the document are relevant:

- Paragraph 55, which states 'Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition.';
- Paragraph 105, which states 'The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health.';
- Paragraph 174, which states 'Planning policies and decisions should contribute to and enhance the natural and local environment by: [...] e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.';
- Paragraph 185, which states '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.';

⁹ Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework

- Paragraph 186, which states 'Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.'; and
- Paragraph 188, which states 'The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities'.

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

2.3 Local Planning Policy

Kent and Medway Energy and Low Emissions Strategy

2.3.1 Gravesham Borough Council is the local authority for Gravesham in Kent. The Kent and Medway Energy and Low Emissions Strategy¹⁰ sets out how the partnership with Medway Council and the Kent district councils, will respond to the UK climate emergency and drive clean, resilient economic recovery across the county. The strategy was adopted by Kent leaders in October 2020.

2.3.2 The Strategy identifies ten high-level priorities for collaborative action in the short- and medium-term. Overview of these priorities identified the following priority of relevance to air quality

¹⁰ Kent and Medway Energy and Low Emissions Strategy (May 2021): Implementation Plan 2020-2023 [Online] Available at <https://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/environmental-policies/kent-and-medway-energy-and-low-emissions-strategy> [Accessed 14/09/2022]

‘Priority 3: Planning and Development

Ensure climate change, energy, air quality and environmental considerations are integrated into Local Plans, policies and developments, by developing a clean growth strategic planning policy and guidance framework for Kent and Medway, to drive down emissions and incorporate climate resilience.’

Air Quality Strategy: Gravesham Borough Council 2006

- 2.3.3 The purpose of Gravesham Borough Council's (GBC) Air Quality Strategy¹¹ is:

‘To address air pollution issues on a wider scale for all pollutants of concern to health, in addition to greenhouse gases; To prevent air quality deteriorating within the Borough and take action to improve air quality; To provide a framework for future air quality issues and review of new/revised Air Quality Objectives and EU Limit; To encourage partnership working within the Council and with neighbouring local authorities; To raise the profile of air quality in the local community and emphasise the role of the local authority in delivering cleaner air by leading by example; To link together other local initiatives and strategies to achieve local emissions reductions.

- 2.3.4 An overview of GBC's Air Quality Strategy identified the following core policies of relevance to air quality:

‘Policy 9: The Council will regularly review its Code of Construction Practice

To ensure that changes in guidance are taken into account and the recommendations represent best practice.’

‘Policy NR5: Development Sensitive to Pollution

Development which would be sensitive to adverse levels of noise, air, light and other pollution, will not be supported where such conditions exist, or are in prospect, and where mitigation measures would not afford satisfactory protection.’

2.4 National Planning Guidance

- 2.4.1 A summary of the publications referred to in undertaking this assessment is provided below.

¹¹ Gravesham Borough Council Local Air Quality Management- Air Quality Strategy (June 2006) [Online] Available at <https://www.gravesham.gov.uk/downloads/file/117/air-quality-strategy-june-2006>[Accessed 13/09/2002]

Local Air Quality Management Review and Assessment Technical Guidance (2021)

- 2.4.2 The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their review and assessment work¹². This guidance, referred to in this document as LAQM.TG16, has been used where appropriate in the assessment presented herein.

Land-Use Planning & Development Control: Planning for Air Quality (2017)

- 2.4.3 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance¹³ that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.

Guidance on the Assessment of Dust from Demolition and Construction (2016)

- 2.4.4 This document¹⁴ published by the IAQM was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM₁₀ impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

National Planning Practice Guidance – Air Quality (2019)

- 2.4.5 This guidance¹⁵ provides a number of guiding principles on how the planning process can take into account the impact of new development on air quality, it explains how much detail air quality assessments need to include for proposed developments, and how impacts on air quality can be mitigated. It also provides information on how air quality is taken into account by local authorities in both the wider planning context of Local Plans and neighbourhood planning, and in individual cases where air quality is a consideration in a planning decision.

¹² Department for Environment, Food and Rural Affairs (Defra) (2021) Part IV The Environment Act 1995 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG16.

¹³ Environmental Protection UK and Institute of Air Quality Management (Version 1.2 Updated January 2017) Land Use Planning & Development Control: Planning for Air Quality.

¹⁴ Institute of Air Quality Management (Version 1.1 Updated June 2016) Guidance on the Assessment of Dust from Demolition and Construction.

¹⁵ Department of Communities and Local Government (DCLG) (Updated November 2019) National Planning Practice Guidance.

3 SCOPE AND METHODOLOGY

3.1 Scope

3.1.1 The scope of the assessment has been determined in the following way:

- A review of the Masterplan of the Proposed Development;
- Review of the traffic data provided by the Project Transport Consultant (TC);
- Desktop study to confirm the locations of nearby existing receptors that may be sensitive to changes in local air quality; and
- Review of GBC's latest available Air Quality Annual Status Report¹⁶ (ASR) and air quality data surrounding the Site including data from the appointed Transport Consultant and Defra¹⁷ and the Environment Agency (EA)¹⁸;

3.1.2 The scope of the assessment includes consideration of the potential impact on local air quality resulting from:

- Dust and particle matter generated by on-site activities during the construction phase;
- Increases in pollutant concentrations as a result of exhaust emissions arising from construction traffic and plant; and
- Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once operational.

3.2 Consultation

3.2.1 The following methodology was emailed to the environmental health department at GBC on 09/09/2022. The EHO confirms their agreement in principle with our proposed methodology to screen out operational phase impacts, however, they have requested a calculation of the damage costs to be included in the report.

3.3 Construction Phase Assessment

3.3.1 Dust comprises particles typically in the size range of 1-75 micrometres (μm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials. The larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited in close proximity to the source of emission. Dust therefore is

¹⁶ Gravesham Borough Council (2022) Gravesham Borough Council: Annual Status Report 2021 [Online] <https://kentair.org.uk/report/gravesham-borough-council-annual-status-report-2021> [Accessed 13/09/2022]

¹⁷ Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management (LAQM) Support Pages [Online] Available at <https://laqm.defra.gov.uk/> [Accessed 19/05/2022]

¹⁸ Department for Environment, Food and Rural Affairs (Defra, 2022) Pollution Inventory [Online] Available at <https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory> [Accessed 19/05/2022]

unlikely to cause long term or wide-spread changes to air quality; however, its deposition on property and cars can cause 'soiling' and discolouration. This may result in complaints of nuisance through amenity loss or perceived damage caused, which is usually temporary.

- 3.3.2 The smaller particles of dust are known as particulate matter (PM), with less than 10 μm in aerodynamic diameter (PM_{10}) representing only a small proportion of total dust released; this includes a finer fraction, known as $\text{PM}_{2.5}$ (with an aerodynamic diameter less than 2.5 μm). As these particles are at the smaller end of the size range of dust particles, they remain suspended in the atmosphere for a longer period of time than the larger dust particles, they can therefore be transported by wind over a wider area. PM_{10} and $\text{PM}_{2.5}$ are small enough to be drawn into the lungs during breathing, which in sensitive members of the public could have a potential impact on health. However, it is worth noting that, according to the IAQM guidance, the majority of fugitive particulate emissions arising from construction sites are expected to relate to the coarser fractions (i.e. $\text{PM}_{2.5-10}$) with just 10-15% expected to comprise $\text{PM}_{2.5}$. The IAQM guidance therefore focusses on PM_{10} for the purposes of assessment.
- 3.3.3 An assessment of the likely significant impacts on local air quality due to the generation and dispersion of dust and PM_{10} during the construction phase has been undertaken using: the relevant assessment methodology published by the IAQM; the available information for this phase of the Proposed Development provided by the Client and/or Project Team; and the professional judgement of the NoiseAir team.
- 3.3.4 The IAQM methodology assesses the risk of potential dust and PM_{10} impacts from the following four sources: demolition, earthworks, construction and trackout. It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in PM_{10} levels to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust impacts. Once the level of risk has been identified, and the significance of residual effects determined. A summary of the IAQM assessment methodology is provided in **Appendix C**.
- 3.3.5 In addition to the impacts on local air quality due to on-site construction activities, exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the application Site and in the vicinity of the application Site itself. As information on the number of vehicles and plant associated with the construction phase was not available at the time of writing, a qualitative assessment of their impact on local air quality has been undertaken using professional judgement and considering the following:

- The number and type of construction traffic and plant likely to be generated by this phase of the development;
- The number and proximity of sensitive receptors to the application Site and along the likely routes to be used by construction vehicles; and
- The likely duration of the construction phase and the nature of the construction activities undertaken.

3.4 Operational Phase Assessment

3.4.1 The development has the potential to expose future residents to any existing air quality issues.

3.4.2 The EPUK & IAQM guidance sets out two stages for determining when an assessment of potential impacts on the local area is likely to be necessary. The Stage 1 criteria for an air quality assessment is presented below:

A. If any of the following apply:

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

B. Coupled with any of the following:

- The development has more than 10 parking spaces; or,
- The development will have a centralised energy facility or other centralised combustion process.

3.4.3 Should these criteria not be met, then the EPUK and IAQM guidance considers air quality impacts associated with a scheme to be negligible and no further assessment is required. Should the criteria be met or exceeded, proceed to Stage 2. Stage 2 of the EPUK & IAQM guidance document states the following criteria to help establish when an air quality assessment is likely to be considered necessary:

- Proposals that will cause a change in Light Duty Vehicle (LDV) flows of more than 100 AADT within or adjacent to an AQMA or more than 500 elsewhere.
- Proposals that will cause a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 elsewhere.
- Proposals that would realign roads within an AQMA by more than 5m.
- Proposals that will introduce new junctions or remove existing junctions near relevant receptors.
- Proposals that will introduce or change a bus station or change flows of buses by more than 25 AADT within an AQMA or more than 100 AADT elsewhere.

- Proposals which will include an underground car park with extraction system which will be within 20m of a relevant receptor and have more than 100 movements per day.
- Proposals which include either a centralised plant using biofuel, a combustion plant with single or thermal input >300KWh or a standby emergency generator associated with a centralised energy centre; and,
- Proposals which include combustion processes of any size.

- 3.4.4 Should these criteria not be met, then the EPUK and IAQM guidance documents consider air quality impacts associated with a scheme to be not significant and no further assessment being required.
- 3.4.5 Should screening of the traffic data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the predicted change in pollutant concentrations as a result of the proposed development.
- 3.4.6 The significance of predicted impacts can then be determined in accordance with the methodology.

Selection of Background Concentrations

- 3.4.7 Background pollutant data for the operational phase assessment have been taken from the national maps provided on the Defra¹⁹ website, where background concentrations of those pollutants included within the AQS have been mapped at a grid resolution of 1x1 km for the whole of the UK. Estimated background concentrations are available for all years between 2018 and 2030. The maps assume that background concentrations will improve (i.e., reduce) overtime, in line with the predicted reduction in vehicle emissions, and emissions from other sources. Due to the uncertainties discussed above, and in line with the findings of many local authorities that measured concentrations have not reduced as anticipated 2019 background concentrations for NO_x, NO₂ and PM₁₀ have been utilised in this assessment for the opening year. This provides a robust assessment and is likely to overestimate pollutant concentrations during the operation of the Proposed Development.

¹⁹ Department for Environment, Food and Rural Affairs (Defra) (2020) Background Concentrations [Online] Available at <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018> [Accessed on 10/09/2022]

4 BASELINE

4.1 Introduction

- 4.1.1 Existing air quality conditions in the vicinity of the Site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

4.2 Local Air Quality Management

- 4.2.1 As required by the Environment Act (1995), GBC has undertaken review and assessment of air quality within their area of jurisdiction. The main source of air pollution within the area is from road traffic. They have four AQMAs declared, three since 2005 and one that was declared in 2002 but was amended in 2012.

- 4.2.2 The Site is not located within an AQMA. It is approximately 400m southeast of the 'Gravesend A226 One-way system AQMA' as described below:

"An area incorporating the entirety of the A226 One-way system in Gravesend."

4.3 Air Quality Monitoring

- 4.3.1 Monitoring of pollutant concentrations is undertaken by GBC throughout their area of jurisdiction. According to the recent ASR, in 2020, GBC undertook automatic (continuous) monitoring at 2 sites and non-automatic (passive) monitoring of NO₂ at 61 sites. Compliance has not been achieved for the past three years in any of the declared AQMAs for the annual mean NO₂ objective. Therefore, there is currently no intention to revoke AQMA designations.
- 4.3.2 Recent NO₂ results recorded by non-automatic monitoring stations in the vicinity of the proposed development are presented in **Table 2**.

Table 2: Non-automatic monitoring Results – NO ₂						
Monitoring Site		Site Type	Distance to Kerb of Nearest Road (m)	Monitored NO ₂ Concentration (µg/m ³)		
ID	Name			2017	2018	2019
GR78	Canal Tavern Public House, Canal Road, Gravesend, DA12 2RS	Roadside	1.8	30.3	31.3	32.5
GR145	Lamp post adjacent Chantry Community Academy, Ordnance Road	Roadside	1.5	N/A	32.2	30.6

- 4.3.3 As shown in **Table 2** measured annual mean NO₂ concentrations in the vicinity of the Site have not been exceeding the relevant AQO in recent years, however, at Canal Tavern Public House site there has been a slight increase of NO₂ concentrations in recent years.

4.4 Background Pollutant Concentrations

- 4.4.1 Predictions of background pollutant concentrations on a 1 km-by-1 km basis have been produced by DEFRA for the entire of the UK to assist local authorities in their review and assessment of air quality. The Site is located in grid square 565500, 173500. Data for this location was downloaded from the DEFRA website and is summarised in **Table 3**.

Table 3: Predicted Background Pollutant Concentrations				
OS Grid Reference (X, Y)	Predicted Background Pollutant Concentration (µg/m ³)			
	2019		2023	
	NO ₂	PM ₁₀	NO ₂	PM ₁₀
565500, 173500	16.7	19.4	15.9	17.3
Rounded to 1 d.p.				

- 4.4.2 As shown in **Table 3**, predicted background NO₂ and PM₁₀ concentrations are well below the relevant AQOs across the assessment extents.

5 ASSESSMENT

5.1 Introduction

- 5.1.1 There is the potential for air quality impacts as a result of the construction and operation of the Proposed Development. These are assessed in the following sections.

5.2 Construction Phase Assessment

- 5.2.1 Construction activities have the potential to generate and/ or re- suspend dust and PM₁₀ sources include:

- Site clearance and preparation including demolition activities;
- Preparation of temporary access/ egress to the Site and haulage routes;
- Earthworks;
- Materials handling, storage, stockpiling, spillage and disposal;
- Movement of vehicles and construction traffic within the Site (including excavators and dumper trucks);
- Use of crushing and screening equipment/ plant;
- Exhaust emissions from plant, especially when used at the extremes of their capacity and during mechanical breakdown;
- Construction of buildings, roads and areas of hard standing alongside fabrication processes;
- Internal and external finishing and refurbishment;
- Trackout, whereby earth is carried from the Site on vehicle tyres, deposited on roads and may later become suspended in the air as a result of vehicle movements; and
- Site landscaping after completion.

- 5.2.2 The majority of the releases are likely to occur during the 'working week'. However, for some potential release sources (e.g., exposed soil produced from significant earthworks activities) in the absence of dust control mitigation measures, dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place.

Assessment of Potential Dust Emission Magnitude

- 5.2.3 The IAQM assessment methodology has been used to determine the potential dust emission magnitude for the following four different dust and PM₁₀ sources: include;

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

5.2.4 The findings of the assessment are presented below.

Demolition

5.2.5 The proposed building volume to be demolished is less than 20,000m³. Potential dust emissions magnitude is therefore **small** for demolition.

Earthworks

5.2.6 The total area of the Site is between 2,500 – 10,000m², the potential dust emission magnitude is therefore considered to be **medium** for earthwork activities.

Construction

5.2.7 The construction of the total volume of buildings on the Site is estimated to be between 25,000 – 100,000m³. It is also assumed that on-site concrete batching may occur with potentially dusty construction material (e.g., concrete), therefore, the potential dust emission magnitude is considered to be **medium** for construction activities.

Trackout

5.2.8 Information on the number of HDVs associated with this phase of the Proposed Development is not available and therefore professional judgement has been used. It has been assumed that given the size of the development area there are likely to be between 10-50 HDV outward movements in any one day. The potential dust emission magnitude is, therefore, **medium** for trackout.

Table 4 provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 4: Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	Small
Earthworks	Medium
Construction Activities	Medium
Trackout	Medium

Assessment of Sensitivity of the Study Area

- 5.2.9 The prevailing wind direction is predominantly from the south-west. Therefore, receptors located to the north-east of the site are more likely to be affected by dust and particulate matter emitted and re-suspended during the construction phase.
- 5.2.10 Under lower wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. Receptors north-east of the Site are expected to be affected the most as a result of the prevailing wind direction. It has been assumed that the construction traffic will access the Site from the A226/Milton Road.
- 5.2.11 There are no ecological receptors within 50 m of the development boundary or access route, or within 500 m of the Site entrance as identified using Multi Agency Geographic Information for the Countryside (MAGIC) website²⁰. As such, ecological impacts have not been assessed further within this report.
- 5.2.12 Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM₁₀ has been derived for each of the construction activities considered. The results are shown in **Table 5**.

Table 5: Sensitivity of the Study Area to Dust Soiling Effects

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

Risk of Impacts

- 5.2.13 The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. **Table 6** below provides a summary of the risk of just impacts for the Proposed

²⁰ Department for Environment, Food and Rural Affairs (Defra) (2022) Multi-Agency Geographic Information for the Countryside (MAGIC) [Online] [Magic Map Application \(defra.gov.uk\)](https://magic.defra.gov.uk/) [Accessed on 15/09/2022]

Development. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 6: Summary Dust Risk Table Defining Site Specific Mitigation

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

Construction Vehicles and Plant

- 5.2.14 The greatest impact on air quality is emissions from vehicles and plant associated with the construction phase will be in the areas immediately adjacent to the Site access road. Construction traffic will access the Site via the local road network. Due to the size of the Site, it is considered likely that the construction traffic will be low in comparison to the existing traffic flows on these roads.
- 5.2.15 Final details of the exact plant and equipment likely to be used on-site will be determined by the appointed contractor, it is considered likely to comprise dump trucks, tracked excavators, diesel generators, asphalt sweepers, rollers, compressors, and trucks. The number of plant and their location within the Site are likely to be variable over the construction.
- 5.2.16 Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, And the likely numbers of construction vehicles and plant that will be used comment the impacts are therefore considered to being **negligible** according to the assessment significance criteria.

5.3 Operational Phase Assessment

Potential Future Exposure

- 5.3.1 The proposed development includes land use sensitive to long term and short-term pollutant concentrations. Existing conditions at the Site are therefore considered in the following Sections.

AQMA Designation

- 5.3.2 The Site is not located within AQMA.

Local Monitoring Results

- 5.3.3 As shown in **Table 2**, GBC have undertaken monitoring of annual mean NO₂ concentrations in the vicinity of the Proposed Development. The recorded NO₂ concentrations at all monitoring locations were below the AQO of 40µg/m³ in recent years, it is considered likely that NO₂ concentrations at the Site will be below the relevant AQO's.
- 5.3.4 Based on the above, exceedances of the relevant AQO's are considered unlikely at the Proposed Development Site.

Background Pollutant Concentration Predictions

- 5.3.5 As shown in **Table 3** background pollutant concentrations for the grid square containing the Site are predicted to be well below the annual mean AQOs for NO₂ and PM₁₀.
- 5.3.6 Based on the predicted background concentrations, exceedances of the relevant AQOs are considered unlikely at the Proposed Development Site.

Summary

- 5.3.7 It is considered likely that pollutant concentrations are below the relevant AQOs at the Proposed Development Site for the following reasons:
- Local monitoring results indicate annual mean NO₂ concentrations are below the relevant AQO; and,
 - Predicted background concentrations are well below the relevant AQOs.
 - Based on the assessment results, exposure of future site users to exceedances of the AQOs is not considered likely. As such, the Site is suitable for the proposed use from an air quality perspective.
- 5.3.8 The Site is therefore considered suitable for its proposed use.

5.4 Potential Development Impacts

- 5.4.1 Any vehicle movements associated with the development will generate exhaust emissions on the local and regional road networks. Predicted daily trip generation from the developments was provided by the applicant which anticipated 102 daily car movements associated with the proposed scheme.
- 5.4.2 Based on the above information, the proposals are not anticipated to result in an increase in LDV flows of more than 500 AADT outside an AQMA, include significant highway realignment or the introduction of a junction and there will not be a requirement for more

than 100 HDV deliveries per day. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM screening criteria shown in Section 4.

5.5 Damage Costs Assessment

- 5.5.1 In response to GBC's request, an assessment of damage costs was conducted. Kent & Medway Air Quality Partnership has produced an 'Air Quality Planning Guidance' document²¹. This provides advice for developers on how to assess and mitigate the impact that new developments may have on local air quality.
- 5.5.2 The pollutant emissions costs calculation identifies the environmental damage costs associated with transport emissions generated by the Proposed Development. The calculation utilises the most recent DEFRA Emissions Factor Toolkit to estimate the additional pollutant emissions from a proposed development and the 'Air Quality Planning Guidance' that utilise the latest DEFRA Air quality appraisal: damage cost guidance²² for the specific pollutant of interest.
- 5.5.3 The output from the EFT is then multiplied by the Interdepartmental Group on Costs and Benefits damage costs for the key pollutants oxides of nitrogen (NO_x) and PM_{2.5}, and finally multiplied by 5 to provide a five-year exposure cost value. This has been summarised in the following equation:

EFT Input:

- 62 Flats (urban not London)
- Daily Vehicle Movements Produced by the Development: 102 trips/annum
- % HGV: 0
- Average Speed (km/h): 50
- Average Trip Length (km): 10

²¹ Kent & Medway Air Quality Partnership: Air Quality Planning Guidance (Mitigation Option A), December 2015.

²² Department for Environment Food & Rural Affairs- Guidance: Air quality appraisal: damage cost guidance, Updated 26 March 2021 [Online]. Available at <https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance#annex-a-updated-2020-damage-costs> [Accessed 19/09/2022]

Table 7: Total Damage Costs Calculations		
Data	NO _x	PM _{2.5}
Annual Link Emissions (kg/year) ^a	76.93	11.76
Annual Link Emissions (tonnes/year)	0.07693	0.01176
Damage Costs (£/tonne) ^b	6,385	51,764 ^c
Damage costs rebased to 2022 ^d	6,930	56,179
^{a.} The output from the EFT ^{b.} Derived from Table 10 of Annex A- Air quality appraisal: damage cost guidance ^{c.} Central damage cost for PM _{2.5} road transport (81,518) x PM _{2.5} /PM ₁₀ conversion factor (0.635) Damage costs rebased to 2022= GDP deflator 2022/2017 = 1.0853 x damage cost		

- 5.5.4 The damage costs is uplifted to 2023, and then uplifted annually thereafter. This is equivalent to multiplying the rebased damage costs by the uplift factors as shown in **Table 8**.

Table 8: Total Damage Costs Calculations- Uplift the damage costs by 2% annually			
Year	Uplift Factor	NO _x	PM _{2.5}
2023	1.126162	7,804	63,267
2024	1.148686	7,948	64,532
2025	1.171659	8,120	65,823
2026	1.195093	8,282	67,139
2027	1.218994	8,448	68,482
2028	1.24337431	8,617	69,852
Uplift the damage costs by 2% annually = Uplift factor for 2023 (1.126162) x Damage costs rebased to 2023			

- 5.5.5 The uplifted damage cost values is multiplied by the change in emissions (tonnes), and the total damage cost of air quality impacts can then be calculated as the sum of annual cost emissions across the 5-year appraisal period as shown in **Table 9**.

Table 9: Annual Cost Emissions (£)		
Year	NO _x	PM _{2.5}
2023	600	744
2024	611	759
2025	625	774
2026	637	790
2027	650	805
2028	663	821
Total	3,786	4,693
Total Damage Costs over the 5-year appraisal period (£)		8,479
Annual Cost Emissions (£) = Annual Link Emissions x Damage Costs		

5.5.6 Based on the calculations above the total mitigation costs for the development over 5 years is suggested to be £8,479. A number of mitigation measures are therefore required in accordance with the criteria provided within the 'Kent & Medway Air Quality Partnership, Air Quality Planning Guidance'. These include the following:

- *Travel plan 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*

-
- 5.5.7 It is considered that the suggested mitigation options would help reduce potential emissions from the development and control air quality impacts within the vicinity of the Site.

6 MITIGATION AND RESIDUAL EFFECTS

6.1 Construction Phase

6.1.1 Based on the construction phase assessment results, mitigation will be required for this phase. Recommended mitigation measures are presented below:

Communications:

- 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, 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 offsite, and the action taken to resolve the situation in the logbook.

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.

Site Preparation

- 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.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have the potential to produce dust from site as soon as possible.

-
- 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 where possible 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 readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- No bonfires or burning of waste materials.

Demolition

- Ensure effective water suppression is used during demolition operations.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove secure covers in small areas during work and not all at once.

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.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos.

Trackout

- Use water-assisted dust sweepers on the access and local roads (if required).
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.
- Implement a wheel washing system, if required.

6.1.2 Detailed mitigation measures to control construction traffic should be discussed with the Local Authority to establish the most suitable access and haul routes for the site traffic. The most effective mitigation will be achieved by ensuring that construction traffic does not pass along sensitive roads (i.e., congested roads, residential roads or unsuitable junctions for large vehicles) where possible. Construction vehicles should be kept clean through the use of wheel washers and sheeted when on public highways. Timing of large-scale vehicle movements to avoid peak hours on the local road network would also be of benefit.

6.2 Residual Effects

- 6.2.1 The residual effects of dust and PM₁₀ generated by construction activities following the application of the mitigation measures described above and good Site practise is considered to be **not significant**.
- 6.2.2 The residual effects of emissions to air from construction vehicles and plant on local air quality is considered to be **not significant**.

6.3 Operational Phase

Mitigation

- 6.3.1 The changes in pollution concentrations attributable to traffic emissions associated with the operational phase of the proposed development (i.e., impacts on local air quality) are **negligible** and therefore, in accordance with the assessment criteria, mitigation is not required. Additionally, pollutant concentrations at the Site are predicted to be below the relevant AQOs and as such additional mitigation is not required at the operational phase.

Residual Effects

- 6.3.2 The residual effects of dust and PM₁₀ generated by construction activities following the application of the mitigation measures described above and good Site practice is considered to be **not significant**.
- 6.3.3 The residual effects of emissions to air from construction vehicles and plant on local air quality is considered to be **not significant**.

7 SUMMARY AND CONCLUSIONS

- 7.1.1 NoiseAir limited was commissioned to undertake this AQA in support of a proposed planning application to construct a retirement village at Bowls Club, Gravesend DA12 2QU.
- 7.1.2 A qualitative assessment of the potential impacts on local air quality from construction activities has been carried out for this phase of the Proposed Development using the IAQM methodology. This identified that there is a **Low to Medium** risk of dust soiling impacts and a **Negligible to Low risk** of increases in particulate matter concentrations due to unmitigated construction activities for human health. However, through good site practise and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases would be significantly reduced. The residual effects of dust and particulate matter generated by construction activities on air quality are therefore considered to be **not significant**. The residual effects of emissions to air from construction vehicles and plant on local air quality is considered to be **not significant**.
- 7.1.3 Based on the extent of predicted population exposure based on the extent of predicted population exposure to the impacts on pollutant concentrations and the guidance provided by the IAQM, the Proposed Development is expected to result in a **negligible** impact associated with the operational phase traffic on nearby receptors and the residual effects are considered to be **not significant**.
- 7.1.4 An assessment of the potential for future users/ residents of the Proposed Development to be exposed to poor air quality has been undertaken. The Site lies within an area where air quality is mainly influenced by emissions associated with road traffic along the existing road network. Pollutants considered in this assessment were NO₂ and PM₁₀.
- 7.1.5 Local monitoring and background modelling data determined the Site to be suitable for its proposed use.
- 7.1.6 During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the screening criteria provided within the IAQM guidance. Due to the low number of trips predicted from the proposals, impacts were predicted to be **not significant**.
- 7.1.7 Based on the assessment significance criteria, the residual effect of the Proposed Development is considered to be **not significant** for all pollutants considered.

-
- 7.1.8 The total mitigation costs for the development over 5 years was calculated to be £8,479. A number of mitigation measures are therefore provided which would help reduce potential emissions from the development
- 7.1.9 Based on the assessment results, air quality issues are not considered a constraint to planning consent for this proposal.

FIGURES

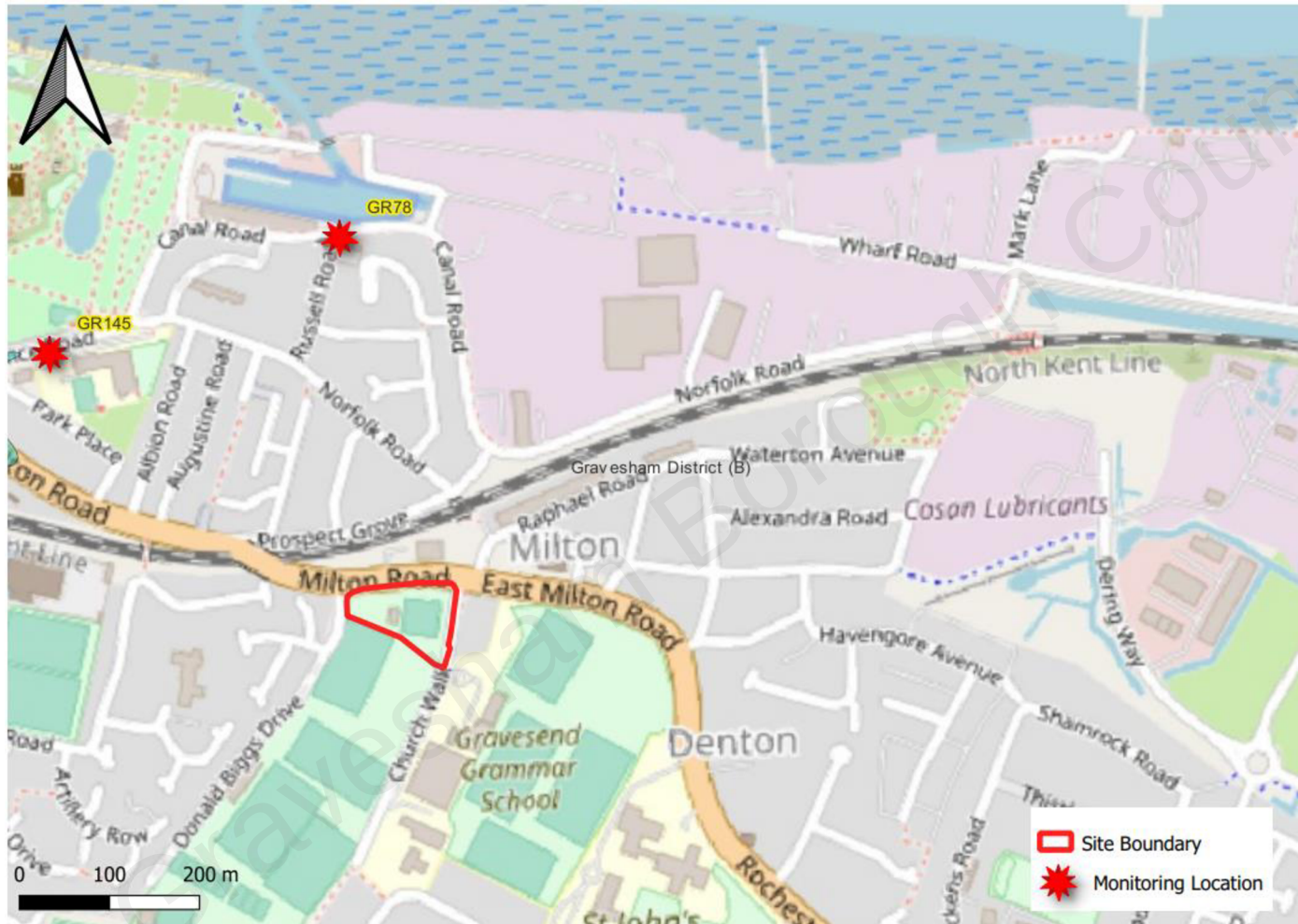


Figure 1 Site Location

APPENDIX A - REPORT LIMITATIONS

This Report is presented to Focus Consultants 2010 LLP and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this report.

Notwithstanding anything to the contrary contained in the report, NoiseAir Limited is obliged to exercise reasonable skill, care and diligence in the performance of the services required by Focus Consultants 2010 LLP and NoiseAir shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

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Where assessments of works or costs identified in this report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

Where / if estimates and projects are made within this report, are made based on reasonable assumptions as of the date of this report, such statements however by their very nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. NoiseAir Limited specifically does not guarantee or warrant any estimates or projects contained in this report.

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APPENDIX B – GLOSSARY

AADT Annual Average Daily Traffic	A daily total traffic flow (24hrs), expressed as mean daily floor across all 365 days of the year.
Adjustment	Application of a correction factor to modelled results to account for uncertainties in the model.
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with the permitted number of exceedances within a specific time scale (see also air quality standard).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	the average (mean) of the concentrations measured for each pollutant for one year.
AQMA	Air Quality Management Area.
AQO	Air Quality Objective.
AURN	Automatic Urban And Rural (air quality) Network, managed by contractors on behalf of Defra.
Conservative	Trending to over predict the impact rather than under predict.
Data Capture	The percentage of all the possible measurements forgiven periods that were validly measured.
Defra	Department for Environment, Food and Rural Affairs.
DfT	Department for Transport
EFT	Emission Factor Toolkit
Emission rate	The quantity of a pollutant released from a source over a given period of time.
EPUK	Environmental Protection (UK)
Exceedance	A period of time where the concentration of a pollutant is greater than the appropriate air quality standard.

HDV/HGV	Heavy Duty Vehicle/Heavy Goods Vehicle.
IAQM	Institute of Air Quality Management.
LAQM	Local Air Quality Management.
Model adjustment	Following model verification, the process by which modelled results are amended. This corrects for systematic error.
NO₂	Nitrogen dioxide.
NO_x	Nitrogen oxides.
PM₁₀	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
Road link	A length of road which is considered to have the same flow of traffic along it. Usually, a link is the road from one junction to the next
µg/m³ micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1µg/m ³ means that one cubic metre of air contains one microgram (millionth of a gram) of a pollutant.

APPENDIX C – IAQM CONSTRUCTION DUST ASSESSMENT METHODOLOGY

IAQM CONSTRUCTION DUST ASSESSMENT METHODOLOGY

Step 1 – Screening the Need for a Detailed Assessment

An assessment will normally be required where there are:

- ‘human receptors’ within 350m of the site boundary; all within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/ or
- ‘ecological receptors’ within 50m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway up to 500m from the site entrance(s)

Where the need for more detail assessment is screened out, it can be concluded that the level of risk is ‘negligible’.

Step 2a – Define the Potential Dust Emission Magnitude

The following are examples of how the potential dust emission magnitude for different activities can be defined. Note that not all criteria need to be met for a particular class. Other criteria can be justified within the assessment.

Table C1: Construction Dust - Magnitude of Emission		
Magnitude	Activity	Criteria
Large	Demolition	- Total volume of building to be demolished greater than 50,000 m³. - Potentially dusty material (e.g., concrete). - On-site crushing and screening. - Demolition activities more than 20m about ground level.
	Earthworks	- Total site area greater than 10,000m². - 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 8m in height. - More than 100,000 tonnes of material moved.
	Construction	- Total building volume greater than 100,000 m³. - On site concrete batching. - Sandblasting.

Table C1: Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
	Trackout	- More than 50 Heavy Duty Vehicle (HDV) trips per day. - Potentially dusty surface material (e.g., high clay content). - Unpaved road length greater than 100m.
Medium	Demolition	- Total volume of building to be demolished between 20,000 m³ and 50,000 m³. - Potentially dusty construction material. - Demolition activities 10m to 20m above ground level.
	Earthworks	- Total site area 2,500m² to 10,000 m². - Moderately dusty soil type (e.g., silt). - to 10 heavy earth moving vehicles active at any one time. - Formation of bunds 4m to 8m in height. - Total material moved 20,000 tonnes to 100,000 tonnes.
	Construction	- Total building volume 25,000m³ to 100,000m³. - Potentially dusty construction material (e.g., concrete). - On site concrete batching.
	Trackout	- 10 to 50 HDV trips per day. - Moderately dusty surface material (e.g., high clay content). - Unpaved road length 50m to 100 m.
Small	Demolition	- Total volume of building to be demolished less than 20,000 m³. - Construction material with low potential for dust release (e.g., metal cladding or timber). - Demolition activities less than 10m above ground and during wetter months.
	Earthworks	- Total site area less than 2,500 m². - Soil type with large grain size (e.g., sand). - Less than 5 heavy earth moving vehicles active at any one time.

Table C1: Construction Dust - Magnitude of Emission		
Magnitude	Activity	Criteria
		- Formation of bunds less than 4m in height. - Total material moved less than 20,000 tonnes. - Earthworks during wetter months.
	Construction	- Total building volume less than 25,000 m³. - Construction material with low potential for dust release (e.g., metal cladding or timber).
	Trackout	- Less than 10 HDV trips per day. - Surface material with low potential for dust release. - Unpaved road length less than 50 m.

Step 2b – Define the Sensitivity of the Area

The tables below present the IAQM assessment methodology to determine the sensitivity of the area to soiling, human health and ecological impacts respectively. The IAQM guidance provides guidance to allow sensitivity of individual receptors to soiling and health effects to assist in the assessment of the overall sensitivity of the study area.

Table C2: Sensitivity of the Area to Dust Soiling Effects					
Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
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 C3: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	Annual Mean PM ₁₀ Concentrations (µg/m ³)	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28	>100	High	Medium	Low	Low	Low

Table C3: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	Annual Mean PM ₁₀ Concentrations (µg/m ³)	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table C4: 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 – Define the Risk of Impacts

The dust emissions magnitude determined in Step 2A should be combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts without mitigation applied. For those cases where the risk category is 'negligible' no mitigation measures beyond those required by legislation will be required.

Table C5: Risk of Dust Impacts			
Sensitivity of Surrounding	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks and Construction			

Table C5: Risk of Dust Impacts			
Sensitivity of Surrounding	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	High Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Step 3 – Site Specific Mitigation

Having determined the risk categories for each of the four activities it is possible to determine the site- specific measures to be adopted. These measures will be related to whether the site is considered to be a low, medium or high risk Site. The IAQM guidance details the mitigation measures required for low, medium and high risk sites as determined in Step 2C.

Step 4 – Determine Significant Effects

Once the risk of dust impacts has been determined in Step 2C under the appropriate dust mitigation measures identified in Step 3, the final step is to determine whether there are significant effects arising from the construction phase. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors. If there are residual effects they will normally be negligible.

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