Land off Capel Street, Capel-Le-Ferne, CT18 7HF

Air Quality Assessment

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1 INTRODUCTION

1.1 Entran Limited has been commissioned to undertake an assessment of air quality impacts associated with a proposed residential development (the 'Proposed Development') at the land off of Capel Street, Capel-Le-Ferne, Kent, CT18 7HF. The location of the application site (the 'Site') is shown in Figure 1.1.

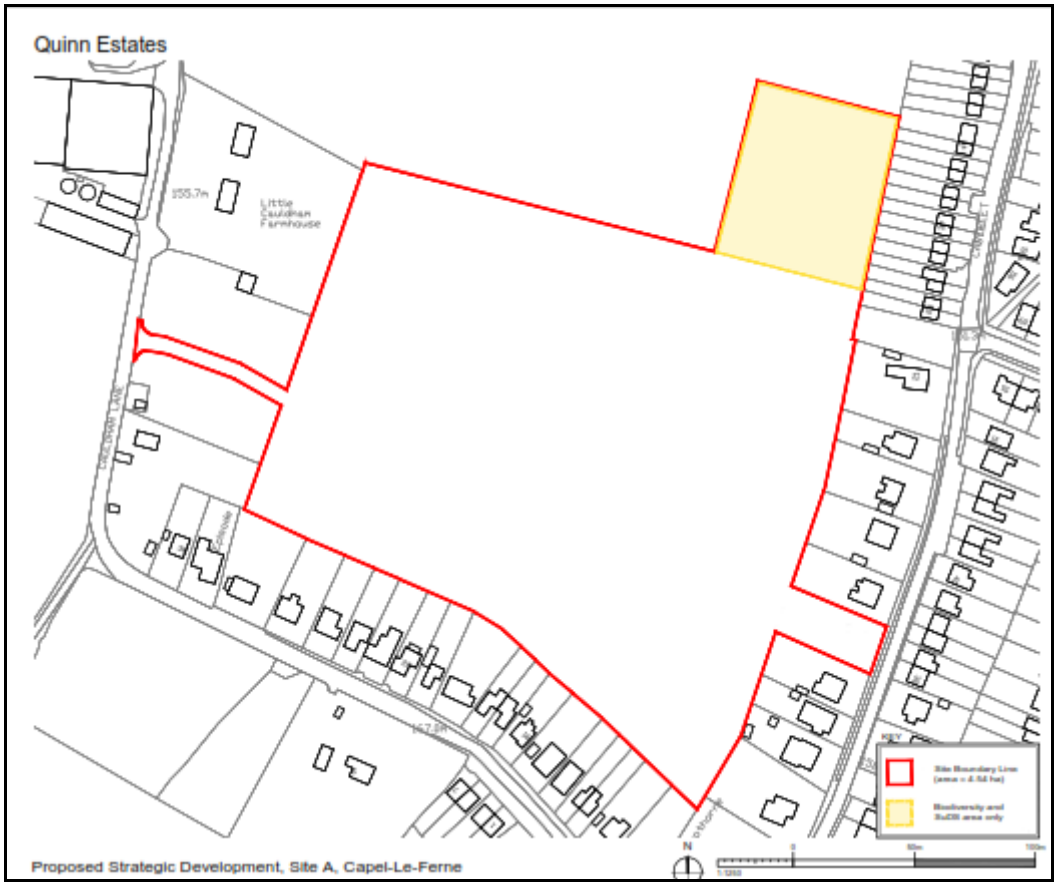
1.2 The proposals are for '*Outline planning application for the erection of up to 90 dwellings with associated parking and infrastructure following demolition of existing dwelling; with all matters reserved except access.'*

1.3 Dover Council (DC) has declared two Air Quality Management Areas (AQMAs) due to exceedances of the annual mean NO_2 objective. The Site is not located within or near an AQMA.

1.4 This report presents the findings of an air quality assessment of the potential impacts of the Proposed Development on local air quality during the construction and operational phases. The source and significance of potential impacts are identified and the measures that should be employed to minimise these impacts are described. Consideration is also given to the suitability of the Site for its proposed end-use with regards to air quality.

1.5 A glossary of common air quality terminology is provided in **Appendix A.**

Figure 1.1: Site Location Plan



2 LEGISLATION AND POLICY

Air Quality Strategy for England, Scotland, Wales & Northern Ireland

2.1 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland published in July 2007[1], pursuant to the requirements of Part IV of the Environment Act 2021. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

2.2 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3-butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10}, $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3) and polycyclic aromatic hydrocarbons (PAHs).

2.3 The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

2.4 The air quality objectives 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 the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

2.5 For some pollutants, there is both a long-term (annual mean) standard and a short-term standard. In the case of nitrogen dioxide (NO_2), the short-term standard is for a 1-hour averaging period, whereas for fine particulates (PM_{10}) it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

2.6 The AQS objective levels relevant to this assessment are set presented in **Appendix B**.

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – July 2007.

Air Quality (England) Regulations

2.7 Many of the objectives in the AQS were made statutory in England with the *Air Quality (England) Regulations 2000*[2] and the *Air Quality (England) (Amendment) Regulations 2002* (the Regulations)[3] for the purpose of Local Air Quality Management (LAQM).

2.8 The Air Quality Standards (Amendment) Regulations 2016[4] amend the Air Quality Standards Regulations 2010 to implement the changes made by Directive (EU) 2015/1480 and came into force on the 31th December 2016. These regulations prescribe the 'relevant period' (referred to in Part I2V of the Environment Act 2021) that local authorities must consider in their review of the future quality of air within their area. The regulations also set out the air quality objectives to be achieved by the end of the 'relevant period'. The Air Quality Standards Regulations were further amended by the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[5] in January 2020 with regards to $PM_{2.5}$.

2.9 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[6] came into force on the 31st January 2023 and adopted into UK law a Target Value for $PM_{2.5}$.

Local Air Quality Management (LAQM)

2.10 Part IV of the Environment Act 2021 also requires local authorities to periodically review and assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

2.11 Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate that part an Air Quality Management Area (AQMA).

2.12 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

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[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 Regulations 2016 – Statutory Instrument 2016 No. 1184

[5] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 – Statutory Instrument 2020 No 1313

[6] The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 – Statutory Instrument 2023 No 96

2.13 The Department of Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their Review and Assessment work[7]. This guidance, referred to in this chapter as LAQM.TG(22), has been used where appropriate in the assessment.

National Planning Policy Framework

2.14 The National Planning Policy Framework (NPPF)[8] sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

2.15 The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to *'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.'*

2.16 Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 180) requires that *'planning policies and decisions should contribute to and enhance the natural and local environment by …preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible help to improve local environmental conditions such as air and water quality'*

2.17 In dealing specifically with air quality the NPPF (paragraph 192) 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*

[7] Department for Environment, Food and Rural Affairs (DEFRA), (2022): Part IV The Environment Act 2021 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(22).

[8] Ministry of Housing, Communities and Local Government: *National Planning Policy Framework* (December 2023).

Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan'.

2.18 Paragraph 194 states that *'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.*'

Planning Practice Guidance

2.19 Planning Practice Guidance (PPG)[9] was updated in November 2019 and supports the NPPF. Paragraph 001, Reference 32-001-20191101 of the PPG, provides a summary as to why air quality is a consideration for planning:

'*… Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit… The local air quality management (LAQM) regime requires every district and unitary authority to regularly review and assess air quality in their area. These reviews identify whether national objectives have been, or will be, achieved at relevant locations, by an applicable date… If national objectives are not met, or at risk of not being met, the local authority concerned must declare an air quality management area and prepare an air quality action plan… Air quality can also affect biodiversity and may therefore impact on our international obligations under the Habitats Directive… Odour and dust can also be a planning concern, for example, because of the effect on local amenity*.'

2.20 Paragraph 002, Reference 32-002-20191101 of the PPG, concerns the role of Local Plans with regard to air quality;

'*Drawing on the review of air quality carried out for the local air quality management regime, plans may need to consider:*

- *what are the observed trends shown by recent air quality monitoring data and what would happen to these trends in light of proposed development and / or allocations;*
- *the impact of point sources of air pollution (pollution that originates from one place);*

[9] Ministry of Housing, Communities & Local Government. (2019). Planning Practice Guidance: Air Quality.

- *the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments, including their implications for vehicle emissions;*
- *ways in which new development could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example, entail identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable; and*
- *opportunities to improve air quality or mitigate impacts, such as through traffic and travel management and green infrastructure provision and enhancement.*'

2.21 Paragraph 006, Reference 32-005-20191101 of the PPG, identifies when air quality could be relevant for a planning decision;

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

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

2.22 Paragraph 007, Reference 32-007-20191101 of the PPG, provides guidance on how detailed an assessment needs to be;

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

2.23 Paragraph 008, Reference 32-007-20191101 of the PPG, provides guidance on how an impact on air quality can be mitigated;

'*Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact… Examples of mitigation include:*

- *maintaining adequate separation distances between sources of air pollution and receptors;*
- *using green infrastructure, in particular trees, where this can create a barrier or maintain separation between sources of pollution and receptors;*
- *appropriate means of filtration and ventilation;*
- *including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points);*
- *controlling dust and emissions from construction, operation and demolition; and*
- *contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development*.'

Dover Core Strategy

2.24 The Dover Core Strategy[10] was adopted in February 2010. DC does not have any local planning policies regarding air quality.

Control of Dust and Particulates associated with Construction

2.25 Section 79 of the *Environmental Protection Act (1990*) provides the following definitions of statutory nuisance relevant to dust and particles:

[10] Dover Council. (2010). Dover Core Strategy.

- ‘Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance’, and
- ‘any accumulation or deposit which is prejudicial to health or a nuisance’.

2.26 Following this, Section 80 states 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.

2.27 In the context of the Proposed Development, the main potential for nuisance of this nature will arise during the construction phase – potential sources being the clearance, earthworks, construction and landscaping processes.

2.28 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. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates.

EPUK & IAQM Land Use Planning and Development Control

2.29 Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) published the Land Use Planning and Development Control Air Quality guidance in January 2017[11] to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

2.30 The main focus of the guidance is to ensure all developments apply good practice principles to ensure emissions and exposure are kept to a minimum. It also sets out criteria for identifying when a more detailed assessment of operational impacts is required, guidance on undertaking detailed assessments and criteria for assigning the significance of any identified impacts.

2.31 This guidance has been used within this assessment.

Assessment of Dust from Demolition and Construction

2.32 The IAQM published guidance on the assessment of emissions from demolition and construction activities[12]. The guidance sets out an approach to identifying the risk of impacts

[11] EPUK & IAQM. Land-use Planning and Development Control: Planning for Air Quality, January 2017

[12] Guidance on the assessment of dust from demolition and construction (version 2.2), IAQM, January 2024.

occurring at nearby sensitive receptors from dust generated during the construction process and sets out recommended mitigation measures based on the identified risk.

2.33 This guidance has been used within this assessment.

Kent & Medway Air Quality Partnership Planning Guidance

2.34 The Kent & Medway Partnership Planning Guidance provides a methodology for assessing the air quality impacts of proposed developments in the Kent and Medway area. This guidance has been used within this assessment.

3 METHODOLOGY

Scope of Assessment

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

- Review of air quality data for the area surrounding the Proposed Development and background pollutant maps;
- Review of the proposals; and
- Review of the traffic flow data.

3.2 During construction of the development there is the potential for impacts to occur as a result of dust and PM_{10} emissions. Guidance provided by the IAQM recommends that an assessment is undertaken where there are human receptors within 350m of the Site boundary or within 50m of the routes used by construction vehicles up to 500m from the site entrance; and where there are dust sensitive ecological receptors within 50m of the Site boundary or within 50m of the routes used by construction vehicles up to 500m from the site entrance. Human receptors are located within 350m of the Site, but there are no dust sensitive ecological habitats in the vicinity of the Site. An assessment of the impacts of the construction of the Proposed Development on human receptors has therefore been included in the assessment. An assessment of the impacts on ecological receptors has not been considered further.

3.3 During the operation of the Proposed Development there is the potential for impacts on local air quality to occur as a result of emissions from road vehicle trips generated by the operation of the Proposed Development. Based on the Department for Transport (DfT) thresholds for transport assessments as set out in Appendix 2 of the Kent and Medway Air Quality Planning Guidance the Proposed Development is classed as a 'major' development (i.e. >50 residential units). Following a review of the Proposed Development against checklist 1 and checklist 2 set out within the Guidance it is concluded that an air quality assessment is required.

3.4 Guidance provided by the EPUK & IAQM provides threshold criteria for establishing when significant impacts on local air quality may occur and when a detailed assessment of potential impacts is required. At locations outside an AQMA, a change in light duty vehicles (LDV) of more than 500 per day and / or a change in heavy duty vehicles (HDV) of more than 100 per day is considered to result in potentially significant impacts on air quality. At locations inside an AQMA, a change in LDVs of more than 100 per day and / or a change in HDVs of more than 25 per day is considered to result in potentially significant impacts on air quality.

3.5 Data provided by the transport consultants indicates that the Proposed Development will not result in an increase in LDVs or HDVs in excess of the threshold values. The Proposed Development's additional traffic amounts to a maximum of 357 trips per day. The impact of the operational Proposed Development on local air quality would therefore be negligible and further assessment of operational impacts have been scoped out of this assessment. The assessment of the operational phase therefore comprises consideration of exposure of future occupants of the Proposed Development to the existing pollutant concentrations and the suitability of the Site for its proposed end use.

3.6 Details of the assessment methodology and the specific issues considered are provided below.

Construction Phase Methodology

Introduction

3.7 To assess the potential impacts associated with dust and PM_{10} releases during the demolition and construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the IAQM has been undertaken.

3.8 This approach divides construction activities into the following four categories:

- demolition;
- earthworks;
- construction; and
- trackout (the transport of dust and dirt from the construction site onto the public road network).

3.9 The assessment methodology then considers 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 PM_{10}.

3.10 The assessment of the risk of dust effects is determined by:

- the scale and nature of the works, which determine the risk of dust arising; and
- the proximity of sensitive receptors.

3.11 Risks are described in terms of there being a low, medium or high risk of dust effects for each of the four separate potential activities. This assessment is based on both IAQM criteria and professional judgement.

3.12 Mitigation measures are identified where necessary and significance of dust effects determined following such mitigation. The significance of the dust effects is based on professional judgement, taking into account the sensitivity of the surrounding area and the existing air quality.

Dust Emission Magnitude

3.13 The magnitude of the dust impacts for each source is classified as Small, Medium or Large depending on the scale of the proposed works. Table 3.1 summarises the IAQM criteria that may be used to determine the magnitude of the dust emission. These criteria are used in combination with site specific information and professional judgement.

Table 3.1: Dust Emission Magnitude Criteria

Source	Large	Medium	Small
Demolition	• Total building volume >75,000m^3 • Potentially dusty material (e.g. concrete) • Onsite crushing and screening • Demolition activities >12m above ground level.	• Total building volume 12,000 - 75,000m^3 • Potentially dusty material • Demolition activities 6 - 12m above ground level.	• Total building volume <12,000m^3 • Construction material with low potential for dust release • Demolition activities <6m above ground level • Demolition during wetter months
Earthworks	• Total site area >110,000m^2 • Potentially dusty soil type (e.g. clay) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >6m in height	• Total site area 18,000 -110,000m^2 • 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	• Total site area <18,000m^2 • 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 >75,000m^3 • On site concrete batching • Sandblasting	• Total building volume 12,000 - 75,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching	• Total building volume <12,000m^3 • Material with low potential for dust release (e.g. metal cladding or timber)
Trackout	• >50 HGV movements in any one day (a) • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100m	• 20 - 50 HGV movements in any one day (a) • Moderately dusty surface material (e.g. silt) • Unpaved road length 50 - 100m	• <20 HGV movements in any one day (a) • Surface material with low potential for dust release • Unpaved road length <50m
(a) HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes.			

Receptor Sensitivity

3.14 Factors defining the sensitivity of a receptor are presented in Table 3.2.

Table 3.2: Factors Defining the Sensitivity of a Receptor

Sensitivity	Human (health)	Human (dust soiling)	Ecological
High	• Locations where members of the public are exposed over a time period relevant to the air quality objectives for PM_{10} (a) • Examples include residential dwellings, hospitals, schools and residential care homes.	• Regular exposure • High level of amenity expected. • Appearance, aesthetics or value of the property would be affected by dust soiling. • Examples include residential dwellings, museums, medium and long-term car parks and car showrooms.	• Nationally or Internationally designated site with dust sensitive features (b) • Locations with vascular species (c)
Medium	• Locations where workers are exposed over a time period relevant to the air quality objectives for PM_{10} (a) • Examples include office and shop workers (d)	• Short-term exposure • Moderate level of amenity expected • Possible diminished appearance or aesthetics of property due to dust soiling • Examples include parks and places of work	• Nationally designated site with dust sensitive features (b) • Nationally designated site with a particularly important plant species where dust sensitivity is unknown
Low	• Transient human exposure • Examples include public footpaths, playing fields, parks and shopping streets	• Transient exposure • Enjoyment of amenity not expected. • Appearance and aesthetics of property unaffected • Examples include playing fields, farmland (e), footpaths, short-term car parks and roads	• Locally designated site with dust sensitive features (b)

(a) In the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day.

(b) Ecosystems that are particularly sensitive to dust deposition include lichens and acid heathland (for alkaline dust, such as concrete).

(c) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.

(d) Does not include workers exposure to PM_{10} as protection is covered by Health and Safety at Work legislation.

(e) Except commercially sensitive horticulture.

3.15 The sensitivity of a receptor will also depend on a number of additional factors including any history of dust generating activities in the area, likely cumulative dust impacts from nearby construction sites, any pre-existing screening such as trees or buildings and the likely duration of the impacts. In addition, the influence of the prevailing wind direction and local topography may be of relevance when determining the sensitivity of a receptor.

Area Sensitivity

3.16 The sensitivity of the *area* to dust soiling and health impacts is dependent on the number of receptors within each sensitivity class and their distance from the source. In addition, human health impacts are dependent on the existing PM_{10} concentrations in the area. Tables 3.3 and 3.4 summarise the criteria for determining the overall sensitivity of the area to dust soiling and health impacts respectively.

Table 3.3: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the source (a)			
		<20m	<50m	<100m	<250m
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

(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.

Table 3.4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} ($\mu g/m^3$)	Number of Receptors	Distance from the source (a)			
			<20m	<50m	<100m	<250m
High	> 32	> 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32	> 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28	> 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	< 24	> 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	>32	> 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28-32	> 10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	<28	-	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.

3.17 For each dust emission source (demolition, construction, earthworks and trackout), the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts.

Risk of Dust Impacts

3.18 The risk of dust impacts prior to mitigation for each emission source is presented in Tables 3.5 and 3.6.

Table 3.5: Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 3.6: Risk of Dust Impacts – Earthworks, Construction and Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Mitigation and Significance

3.19 The IAQM guidance provides a range of mitigation measures which are dependent on the level of dust risk attributed to the site. Site specific mitigation measures are also included where appropriate.

3.20 The IAQM assessment methodology recommends that significance criteria are only assigned to the identified risk of dust impacts occurring from a construction activity following the application of appropriate mitigation measures. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effects will normally be negligible.

Construction Traffic

3.21 Construction traffic will contribute to existing traffic levels on the surrounding road network. The greatest potential for impacts on air quality from traffic associated with this phase of the Proposed Development will be in the areas immediately adjacent to the principal means of access for construction traffic.

3.22 Based on the size and location of the Proposed Development, the number of vehicles associated with construction of the Proposed Development is not predicted to be significant in terms of total emissions or construction duration. As such, an assessment of impacts arising from construction vehicle emissions using the local roads has not been included in this assessment.

Operational Phase Methodology

3.23 As discussed in the scoping section, the impact of the traffic associated with the operation of the Proposed Development is considered to be negligible and therefore the assessment of operational phase considers only the likely exposure of future occupants of the Proposed Development to existing pollutant levels and the suitability of the Site for its proposed end use. A qualitative assessment has been undertaken with reference to the EPUK & IAQM guidance.

4 BASELINE CONDITIONS

Dover Council Review and Assessment of Air Quality

4.1 DC has carried out detailed assessments of air quality in the area and as a result has declared two AQMAs within Dover. Both are due to potential exceedences of the AQS objectives for annual mean NO_2 concentrations. The Site is not located within or near an AQMA. The review and assessment has not identified any exceedances of the air quality objectives in the vicinity of the Site.

Automatic Local Monitoring Data

4.2 DC operates one automatic monitoring site in Dover located approximately 7.9km to the northeast of the Proposed Development which monitors PM_{10} concentrations. Bias adjusted data obtained from the Dover Centre monitoring station is presented in Tables 4.1.

Table 4.1: PM_{10} Concentrations recorded at the Dover Centre Automatic Monitor (µg/m^3)

Monitoring Site	Statistic	2018	2019	2020	2021	2022
Dover Centre (Roadside)	Annual Mean (µg/m^3)	26.0	22.0	22.7	20.8	22.0
	Number of 24-hour means > 50 µg/m^3	7	8	1	0	2
Data obtained from DC Air Quality Annual Status Report 2023						

4.3 Annual mean PM_{10} concentrations recorded at Dover Centre have been consistently well below the 40 µg/m^3 objective since 2018.

4.4 Exceedences of the 24-hour objective have been recorded at the monitoring station during the five years of the monitoring presented, however the objective allows for 35 exceedences of the 50 µg/m^3 limit in any given year therefore the objective was met in all five monitoring years.

4.5 Based on the data recorded at this site, PM_{10} concentrations are expected to meet the annual mean and 24-hour objectives at the Proposed Development.

Non-Automatic Monitoring

4.6 NO_2 diffusion tube monitoring is carried out at 21 locations in Dover. None of these tubes are located in the vicinity of the Proposed Development. Data from the closest monitoring site to the Proposed Development is presented in Table 4.2 below.

Table 4.2: NO_2 Concentrations recorded at the nearest Diffusion Tube Monitor (µg/m^3)

Monitoring Site	Type	2018	2019	2020	2021	2022
DV-28 Sunny Corner, Old Folkestone Road, Dover	Urban Background	-	-	-	14.1	16.3
Data obtained from DC Air Quality Annual Status Report 2023						

4.7 At the above diffusion tube site, NO_2 concentrations were below the annual mean objective in the years of monitoring presented.

4.8 Diffusion tubes cannot monitor short-term NO_2 concentrations, however, research has concluded[13] that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m^3. Annual mean NO_2 concentrations were well below 60 µg/m^3 at the monitoring site therefore it is expected that the 1-hour objective is being met at this location.

4.9 Based on the data recorded at this site, NO_2 concentrations are expected to meet the annual mean and 1-hour mean objectives at the Proposed Development.

Defra Background Maps

4.10 Additional information on background concentrations in the vicinity of the Site has been obtained from the Defra background pollutant maps. Concentrations from the following grid square, 624500, 138500, which includes the Site and surrounding area, are provided below in Table 4.3.

4.11 The 2018 Defra background maps, which provide estimated background concentrations between 2018 and 2030, have been used to obtain concentrations for 2024. The data is set out in Table 4.3.

[13] D. Laxen and B Marner (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites.

Table 4.3: Estimated Annual Mean Background Concentrations from Defra Maps (µg/m^3)

Pollutant	2024 Background Concentrations at Proposed Development	Air Quality Standard
NO_2	8.1	40
PM_{10}	13.3	40
$PM_{2.5}$	8.5	20

4.12 The data presented in Table 4.3 shows that estimated annual mean background concentrations of all three pollutants to be well below the relevant annual mean objectives in the vicinity of the Site.

5 ASSESSMENT OF IMPACT

Construction Phase

Area Sensitivity

5.1 The assessment of dust impacts of demolition, earthworks, construction works and trackout is dependent on the proximity of the most sensitive receptors to the Site boundary. A summary of the receptor and area sensitivity to health and dust soiling impacts is presented in Table 5.1.

Table 5.1: Sensitivity of Receptors and the Local Area to Dust and PM_{10} Impacts

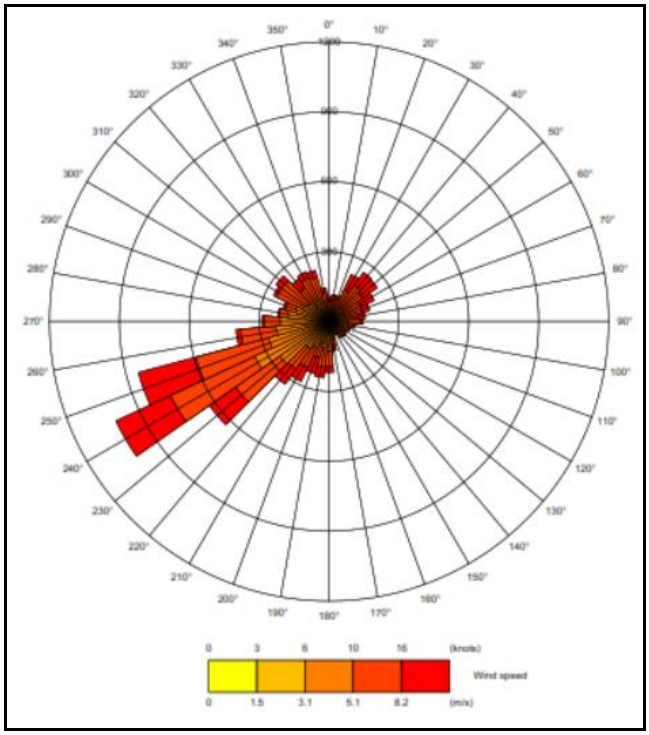
Receptor	Distance from Site Boundary (m)	Approx. Number of Receptors	Sensitivity to Health Impacts (a)		Sensitivity to Dust Soiling Impacts	
			Receptor	Area	Receptor	Area
Residential Properties	<20 m	1-10	High	Low	High	Medium
	<50 m	10-100	High	Low	High	Medium
Overall Sensitivity of the Area			**Low**		**Medium**	
(a) Estimated background PM_{10} concentration is 13.3 µg/m^3.						

5.2 The route of the construction traffic is assumed to be Cauldham Lane and Capel Street. As the Proposed Development site is large in size, the sensitivity of the area to impacts arising from track-out is considered within a distance of 500m from the site entrance. There are several sensitive receptors along the roads within this distance, therefore the sensitivity of the area to impacts from trackout is considered to be high for dust impacts and low for human health impacts.

5.3 The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited will depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

5.4 A wind rose from Langdon Bay is provided in Figure 5.1, which shows that the prevailing wind is from the southwest, therefore receptors to the northeast of the Proposed Development are the most likely to experience dust impacts from the Proposed Development. Residential properties are located to the northeast of the Proposed Development.

Figure 5.1: Wind Rose for Langdon Bay Meteorological Station



Dust Emission Magnitude

5.5 Dust emissions during demolition will depend on the scale of the works, the methods used for demolition and the material of the building to be demolished. Any structures requiring demolition at the Site will have a volume of less than 12,000m^3. Demolition activities are expected to occur <6m above ground. The magnitude of the dust emission for the demolition phase is therefore considered to be *small*.

5.6 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling of the site and landscaping. Given the size of the Site (between 18,000m^2 and 110,000m^2), the magnitude of the dust emission for the earthworks phase is considered to be *medium*.

5.7 Dust emissions during construction will depend on the scale of the works, method of construction, construction materials and duration of build. Based on the overall size of the Proposed Development (between 12,000m^3 and 75,000m^3) and the likely construction materials, the dust emission magnitude is considered to be *medium*.

5.8 Factors influencing the degree of trackout and associated magnitude of effect include vehicle size, vehicle speed, vehicle numbers, geology and duration. Construction traffic will access the Proposed Development site via Cauldham Lane and Capel Street. Based on the likely movements per day (<50 outward HDV movements), dust emission magnitude due to trackout is considered to be *medium.*

Dust Risk Effects

5.9 A summary of the potential risk of dust impacts, based on the low overall sensitivity of the area to human health impacts and medium overall sensitivity to dust soiling, is presented in Table 5.2.

Table 5.2: Risk of Dust Impacts Prior to Mitigation

Source	Impact Magnitude	Human Health Risk	Dust Soiling Risk
Demolition	Small	Negligible	Low
Earthworks	Medium	Low	Medium
Construction	Medium	Low	Medium
Trackout	Medium	Low	Medium

Operational Phase

5.10 As indicated in Section 4 of this report, NO_2, PM_{10} and $PM_{2.5}$ concentrations are consistently well below the AQS in the vicinity of the Site. The Defra background data outlined in Table 4.3, which are well below the relevant objectives, are considered to be representative of concentrations at the Site.

5.11 The Site is located in a predominately residential/agricultural area. The main source of emissions to air in the area is from road traffic. Data provided by the transport consultants indicates that in the opening year of the Proposed Development (2029), the AADT will be 1802 and 8101 on Capel Street and New Dover Road, respectively, adjacent to the Site. These are considered to be 'quiet' roads (fewer than 10,000 vehicles a day) with reference to the AEA/Defra diffusion tube guidance[14]; with a separation distance of more than 10m between the roads and the façades of the residential units, the Site is considered a background site, and therefore it is considered unlikely that emissions from these roads will significantly impact residents of the Proposed Development.

[14] AEA Energy & Environment for Defra. (2008). Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance.

5.12 It is considered likely that the existing concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the location of the Site are currently below the relevant AQS objective levels such that the impact on exposure will be negligible. It is not expected that proposed occupants will be exposed to unacceptable concentrations of pollutants. As such, the Proposed Development is considered to be suitable for its proposed end use.

EMISSIONS MITIGATION CALCULATION

5.13 In accordance with the advice provided in the Kent and Medway Air Quality Partnership Air Quality Planning Guidance, mitigation measures will be implemented to reduce operational emissions.

5.14 In order to assist in determining the value of emissions mitigation required an Emissions Mitigation Assessment was completed including an emissions mitigation calculation in accordance with the advice provided in the Kent and Medway Air Quality Planning Guidance and Defra's Damage Costs Appraisal Toolkit.

Table 5.3: Emissions Mitigation Calculation

	NO_x	$PM_{2.5}$
Proposed Development Trips (as AADT)(1)	357 (0% HGV)	
Average Trip Length (km)(2)	13.8	
Emissions (kg/yr)(3)	70.63	6.56
Emissions (tonnes/yr)	0.71	0.007
Damage Cost (per tonne)(4)	£9,493.00	£82,253.00
Cost of 5 Year Exposure	£8,861.64	£12,917.27
Total	**£21,778.91**	

(1) Provided by Transport Consultants

(2) Obtained from National Travel Survey 2017 (Av miles travelled per car per person in a year /av no of trips made per car per person in a year) (5104/594 = 8.6 miles (13.8km))

(3) Value obtained from EFT spreadsheet for 2028 (assuming average speed of 48kph)

(4) IGCB Air Quality Damage Costs per tonne (2022 prices) (Central Estimate for Transport Urban Large)

5.15 The Emissions Mitigation Calculation presented above suggests a damage cost of £21,778.91. A range of costs is provided, the above damage cost is based on the Central Estimate.

6 MITIGATION

Construction Phase

6.2 The control of dust emissions from construction site activities relies upon management provision and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, construction operations have been successfully undertaken without impacts to nearby properties.

6.3 Overall the Proposed Development is considered to be a medium risk of dust impacts and low risk to human health from particulate matter concentrations at nearby receptors during the construction phase. Appropriate mitigation measures for the Proposed Development have been identified following the IAQM guidance and based on the risk effects presented in Table 5.2. It is recommended that the 'highly recommended' measures set out in the IAQM guidance and reproduced in **Appendix C** are incorporated into a Dust Management Plan (DMP) and approved by DC prior to commencement of any work on the Site.

6.4 Following implementation of the 'highly recommended' measures outlined in the IAQM guidance and reproduced in **Appendix C**, the impact of emissions during construction of the Proposed Development would be negligible.

Operational Phase

6.5 The review has shown that the existing pollutant concentrations within the vicinity of the Site are likely to be well below the relevant AQS objective levels.

6.6 The Kent and Medway Air Quality Partnership Air Quality Planning Guidance recommends the following mitigation measures for residential developments:

- All gas boilers installed in the dwellings shall meet a minimum standard of <40mgNOx/kWh;
- 1 Electric Vehicle charging point per dwelling with dedicated parking;
- Travel plan (where required) including mechanisms for discouraging high emission vehicle use and encouraging the uptake of low emission fuels and technologies;
- A Welcome Pack available to all new residents online and as a booklet, containing information and incentives to encourage the use of sustainable transport modes from new occupiers;
- Adequate provision of secure cycle storage; and
- Using green infrastructure, in particular trees to absorb dust and other pollutants.

6.7 The cost of implementing and maintaining the proposed Travel Plan will exceed the Damage Cost figure calculated in Table 5.3.

7 CONCLUSIONS

7.1 An air quality impact assessment has been carried out to assess both construction and operational impacts of the Proposed Development.

7.2 An assessment of the potential impacts during the construction phase has been carried out in accordance with the latest Institute of Air Quality Management Guidance. This has shown that for the Proposed Development, limited releases of dust and particulate matter are likely to be generated from on-site activities. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and particulate matter releases may be effectively mitigated and the resultant impacts are considered to be negligible.

7.3 There is no significant traffic associated with the Proposed Development. A review of baseline air quality monitoring data indicates that NO_2, PM_{10} and $PM_{2.5}$ concentrations in the vicinity of the Site are likely to be well below the relevant air quality objectives. The introduction of receptors to the area will not therefore increase exposure to poor air quality within the area.

7.4 Mitigation measures have been suggested in line with an emissions mitigation calculation for the Proposed Development.

7.5 It is concluded that air quality does not pose a constraint to the Proposed Development, either during construction or once operational.

APPENDIX A - AIR QUALITY TERMINOLOGY

Term	Definition
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 a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
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. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
ppb parts per billion	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10^9) units of air, there is one unit of pollutant present.
ppm parts per million	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppm means that for every billion (10^6) units of air, there is one unit of pollutant present.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
µg/m^3 micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1ug/m3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

APPENDIX B - AIR QUALITY STRATEGY OBJECTIVES

Table B1: Air Quality Strategy Objectives

Pollutant	Objective Level ($\mu g/m^3$)	Averaging Period	No. of Permitted Exceedances	Notes
NO_2	200 (a)	1-Hour	18 per annum (99.8th percentile)	
	40 (a)	Annual	-	
PM_{10}	50 (a)	24-Hour	35 per annum (90.4th percentile)	
	40 (a)	Annual	-	
$PM_{2.5}$	20 (b)	Annual		
	12 (b)	Annual		Interim Target to be achieved by end Jan 2028
	10 (c)	Annual		Target Level to be achieved by end Dec 2040

(a) Air Quality Standards Regulations (2016) and amendments

(b) Environmental Improvement Plan 2023

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

APPENDIX C - CONSTRUCTION MITIGATION MEASURES

It is recommended that the 'highly recommended' measures set out below are incorporated into a DMP and approved by DC prior to commencement of any work on site:

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- display the head or regional office contact information on the site boundary;
- record all dust and air quality complaints, identify cause, take appropriate measures to reduce emissions in a timely manner and record the measures taken;
- make the complaints log available to the local authority when asked;
- record any exceptional incidents that cause dust and/or air emissions, either on- or off- site and the action taken to resolve the situation in the log book;
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to DC when asked;
- increase frequency of site inspection by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged periods of dry or windy conditions;
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by the IAQM on *monitoring during demolition, earthworks and construction*;
- 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 as necessary that are at least as high as any stockpiles;
- fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- avoid site runoff of water or mud;
- keep site fencing, barriers and scaffolding clean using wet methods;
- remove materials that have a potential to produce dust from site as soon as possible unless being re-used on site;
- cover, seed or fence stockpiles to prevent wind whipping;
- 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;

- produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials;
- only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction e.g. suitable local exhaust ventilation systems;
- ensure an adequate water supply on site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- use enclosed chutes and conveyors and covered skips;
- minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- avoid bonfires and burning of waste materials;
- ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- avoid dry sweeping of large areas;
- ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- record all inspections of haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- access gates to be located at least 10m from receptors where possible.

The following 'desirable' measures should also be considered for inclusion within the DMP:

- undertake daily on-site and off-site inspection, where receptors area nearby, to monitor, record inspection results and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary;

- impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate);
- implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing);
- re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable;
- only remove the cover in small areas during work and not all at once;
- avoid scabbling (roughening of concrete surfaces);
- ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- for smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent.