Air Quality Assessment:
1 Adrian Street, Dover

May 2020

Experts in air quality
management & assessment

Document Control

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Executive Summary

The air quality impacts associated with the proposed residential development of land at 1 Adrian Street, Dover have been assessed.

The development site is adjacent to the junction of the A256 York Street and A20 Snargate Street. The assessment has, however, demonstrated that future residents of the proposed development will experience acceptable air quality, with pollutant concentrations below the air quality objectives.

The proposed development will not provide any car parking and will therefore not generate any significant traffic on the local road network. There will be no centralised energy plant and thus no significant point sources of emissions within the proposed development. The proposed development will therefore have no significant effect on local air quality once operational.

During the construction works, a range of best practice mitigation measures will be implemented to reduce dust emissions and the overall effect will be 'not significant'; appropriate measures have been set out in this report, to be included in the Dust Management Plan for the construction works.

Overall, the construction and operational air quality effects of the development are judged to be 'not significant'.

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1 Introduction

1.1 This report describes the potential air quality impacts associated with the proposed residential development of land at 1 Adrian Street, Dover. The assessment has been carried out by Air Quality Consultants Ltd on behalf of Emervest Ltd.

1.2 The proposed development will consist of 29 residential apartments. It lies within an Air Quality Management Area (AQMA) declared by Dover District Council for exceedances of the annual mean nitrogen dioxide (NO_2) objective. The new residential properties will be subject to the impacts of road traffic emissions from the adjacent road network, in particular from the A256 (York Street) and A20 (Snargate Street). The main air pollutants of concern related to road traffic emissions are nitrogen dioxide and fine particulate matter (PM_{10} and $PM_{2.5}$).

1.3 The development is not anticipated to increase traffic flow on the local road network, as the proposals do not include any car parking spaces and will instead include bike storage facilities. There will be no centralised energy plant and thus no significant point sources of emissions within the proposed development. The impact of the development on air quality at existing residential properties has, therefore, not been considered further, and is judged to be 'not significant'.

1.4 There is the potential for the construction activities to impact upon existing properties. The main pollutants of concern related to construction activities are dust and PM_{10}.

1.5 This report describes existing local air quality conditions (base year 2018), and the predicted air quality that future residents will be exposed to in 2021, which is the earliest anticipated year of occupation of the new homes. The assessment of construction dust impacts focuses on the earliest anticipated duration of works.

1.6 This report has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with Dover District Council.

2 Policy Context and Assessment Criteria

2.1 The United Kingdom formally left the European Union (EU) on 31 January 2020; until the end of 2020 there will be a transition period while the UK and EU negotiate additional arrangements. During this period EU rules and regulations will continue to apply to the UK. All European legislation referred to in this report is written into UK law and will remain in place beyond 2020, unless amended, although there is uncertainty at this point in time as to who will enforce the requirements of some of this legislation.

Air Quality Strategy

2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an AQMA and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Clean Air Strategy 2019

2.3 The Clean Air Strategy (Defra, 2019a) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

2.4 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.5 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has since announced *"plans to bring forward an end to the sale of new petrol and diesel cars and vans to 2035, or earlier if a faster transition is feasible, subject to consultation, as well as including hybrids for the first time"*. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

Planning Policy

National Policies

2.6 The National Planning Policy Framework (NPPF) (2019a) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which is an environmental objective:

"to 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".

2.7 To prevent unacceptable risks from air pollution, the NPPF states 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 quality".

and

"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".

2.8 More specifically on air quality, the NPPF makes clear that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as

possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan".

2.9 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019b), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified".

2.10 Regarding plan-making, the PPG states:

"It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality".

2.11 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan "*identifies measures that will be introduced in pursuit of the objectives and can have implications for planning*". In addition, the PPG makes clear that *"Odour and dust can also be a planning concern, for example, because of the effect on local amenity"*.

2.12 Regarding the need for an air quality assessment, the PPG states that:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity".

2.13 The PPG sets out the information that may be required in an air quality assessment, making clear that:

"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".

2.14 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented".

Local Transport Plan

2.15 The Kent Local Transport Plan 4 (Kent County Council, 2017) sets out a number of objective outcomes, including one relating to air quality. The policy accompanying Outcome 5 - Better Health and Wellbeing - states:

"Provide and promote active travel choices for all members of the community to encourage good health and wellbeing, and implement measures to improve local air quality".

2.16 The LTP4 discusses the air quality concerns relating to the number of Heavy Duty Vehicles using the A20, and the junction improvements works for the York Street / A20 roundabout, which will help facilitate the anticipated Port growth to 2035. These junction improvement works were completed in early 2017.

Local Policies

2.17 Dover District Council is currently developing a new Local Plan, due for adoption in April 2022, which will replace existing Development Plan documents. Until this time, the existing Core Strategy and Dover District Local Plan 2002 saved policies present the current planning policy.

2.18 The Dover District Core Strategy (Dover District Council, 2010) was adopted in February 2010; the Core Strategy identifies local air quality as a sustainability issue due to local traffic, however it does not include any specific policies which are relevant to this assessment. The Dover District Local Plan saved policies are also not directly relevant to this assessment. Air Quality Action Plans.

National Air Quality Plan

2.19 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018a) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a CAZ. There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in the modelling undertaken for this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed

development. This assessment has principally been carried out in relation to the air quality objectives, rather than the EU limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

2.20 Dover District Council has declared two AQMAs for exceedances of the annual mean nitrogen dioxide objective. The A20 AQMA, originally declared in 2004, and most recently amended in 2009, covers a section of the A20 from beyond the Limekiln Roundabout to 140 m beyond the Eastern Docks in Dover. The High Street/Ladywell AQMA, declared in 2007, encompasses roads and properties between the Effingham Crescent/High Street junction and Priory Hill/High Street junction. The Air Quality Action Plan (AQAP) published in 2007 identified a number of measures to improve air quality adjacent to the A20, including direct measures (improvements to the A20; diversion of traffic to the A2/M2 corridor) and indirect measures (reducing the need to travel by car; encouraging the use of public transport). The AQAP is currently being updated.

Assessment Criteria

2.21 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

2.22 The UK-wide objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2018b). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour mean PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m^3 (Defra, 2018b). The predicted annual mean PM_{10} concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM_{10} objective. Where predicted annual mean concentrations are below 32 µg/m^3 it is unlikely that the 24-hour mean objective will be exceeded.

2.23 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2018b). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of

residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

2.24 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

2.25 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
Fine Particles (PM_{10})	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3 [a]
Fine Particles ($PM_{2.5}$) [b]	Annual Mean	25 µg/m^3

[a] A proxy value of 32 µg/m^3 as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM_{10} objective are possible (Defra, 2018b).

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Construction Dust Criteria

2.26 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management (IAQM)[1] (2016) has been used. Full details of this approach are provided in Appendix A1.

[1] The IAQM is the professional body for air quality practitioners in the UK.

Descriptors for Air Quality Impacts and Assessment of Significance

Construction Dust Significance

2.27 Guidance from IAQM (2016) is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that effects will normally be 'not significant'.

Operational Significance

2.28 There is no official guidance in the UK in relation to development control on how to describe air quality impacts, nor how to assess their significance. The approach developed jointly by Environmental Protection UK (EPUK) and the IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement, taking account of the impact descriptors. Full details of the EPUK/IAQM approach are provided in Appendix A2. The approach includes elements of professional judgement, and the experience of the consultants preparing the report is set out in Appendix A3.

3 Assessment Approach

Consultation

3.1 The assessment follows a methodology agreed with Dover District Council via email correspondence between Brian Gibson (Senior Environmental Protection Officer at Dover District Council) and Denise Evans (Air Quality Consultants) held in April 2020.

Existing Conditions

3.2 Existing sources of emissions within the study area have been defined using a number of approaches. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2020a). Local sources have also been identified through examination of the Council's Air Quality Review and Assessment reports.

3.3 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. This covers both the study area and nearby sites, the latter being used to provide context for the assessment. Background concentrations have been defined using the 2017-based national pollution maps published by Defra (2020b). These cover the whole of the UK on a 1x1 km grid.

3.4 Whether or not there are any exceedances of the annual mean EU limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2019b) (2020c). These maps are used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to EU data quality standards, to report exceedances of the limit value to the EU. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2020c), which are available for the years 2009 to 2018, show no exceedances of the limit values anywhere in the UK in 2018.

Construction Impacts

3.5 The construction dust assessment considers the potential for impacts within 350 m of the site boundary; or within 50 m of roads used by construction vehicles. The assessment methodology is that provided by IAQM (2016). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix A1 explains the approach in more detail.

Road Traffic Impacts

Sensitive Locations

3.6 Concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ have been predicted at a number of locations at the boundaries of the proposed development. Receptors have been identified to represent a range of exposure within the development, including the worst-case locations (these being at the façades of the building closest to the sources). When selecting receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested and where there is a combined effect of several road links.

3.7 Ten receptor locations have been identified within the new development. These locations are described in Table 2 and shown in Figure 1. Concentrations were predicted at a range of heights representing ground, first and second floor exposure, as appropriate. In addition, concentrations have been modelled at three diffusion tube monitoring sites located adjacent to the A20 Snargate Street southwest of the development, in order to verify the model outputs (see Appendix A4 for verification method).

Table 2: Description of Receptor Locations [a]

Receptor	Description	Ground Floor Height (m)	First Floor Height (m)	Second Floor Height (m)
Receptor 1	Building B – facing road	1.50	4.35	7.20
Receptor 2	Building B – facing road	1.50	4.35	7.20
Receptor 3	Building B – facing road	1.50	4.35	7.20
Receptor 4	Building B – facing road	1.50	4.35	7.20
Receptor 5	Building B – rear	1.50	4.35	7.20
Receptor 6	Building B – rear	1.50	4.35	7.20
Receptor 7	Building A - facing road	-	5.45	8.30
Receptor 8	Building A - facing road	-	5.45	8.30
Receptor 9	Building A - rear	-	5.45	8.30
Receptor 10	Building A - rear	-	5.45	8.30

[a] Building A receptors were not modelled at ground floor level, as there are no residential apartments situated here. All heights are relative to the nearest modelled road.

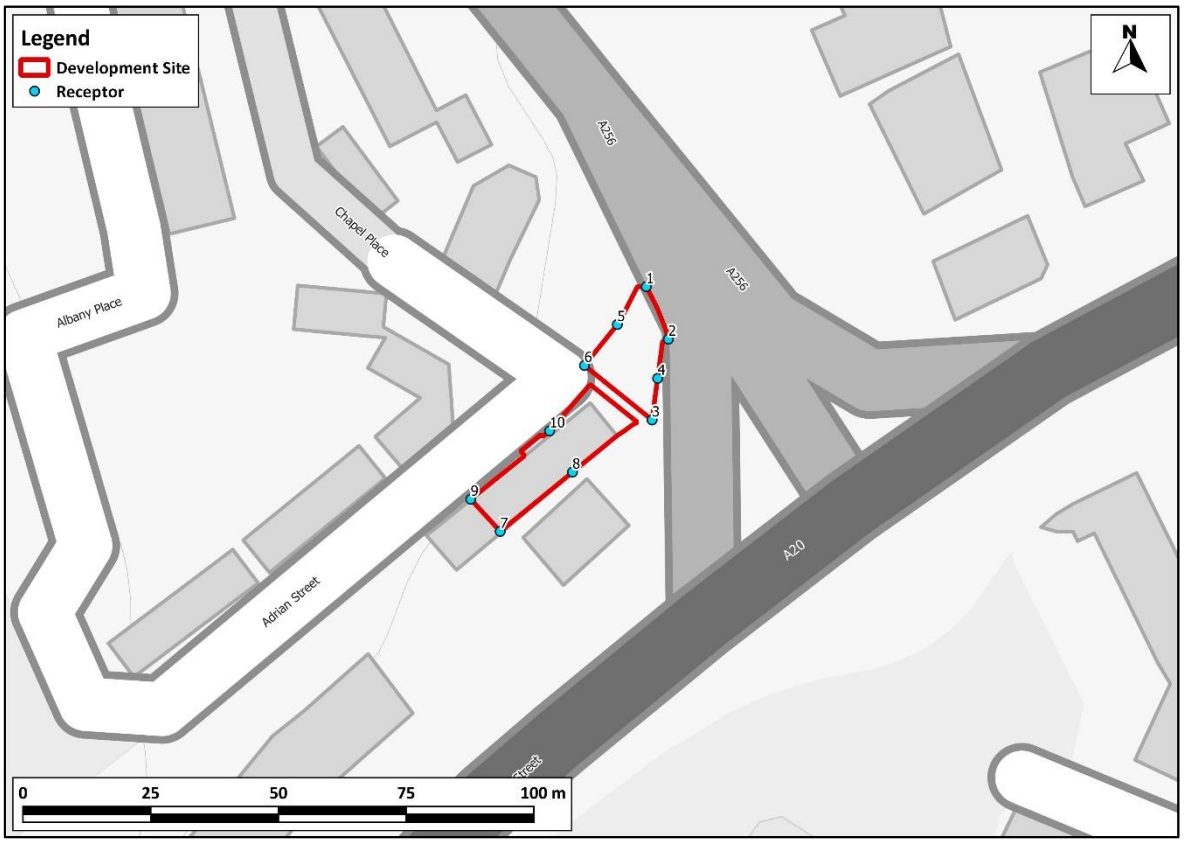

Figure 1: Receptor Locations

Modelling Methodology

3.8 Concentrations have been predicted using the ADMS-Roads dispersion model, with vehicle emissions derived using Defra's Emission Factor Toolkit (EFT) (v9.0) (Defra, 2020b). Details of the model inputs, assumptions and the verification are provided in Appendix A4, together with the method used to derive base and future year background concentrations. Where assumptions have been made, a realistic worst-case approach has been adopted.

Assessment Scenarios

3.9 Nitrogen dioxide, PM_{10} and $PM_{2.5}$ concentrations have been predicted for a base year (2018) and the first possible year of occupation (as 2021).

Traffic Data

3.10 Traffic data for the assessment have been determined from the interactive web-based map provided by DfT (2020). Further details of the traffic data used in this assessment are provided in Appendix A4.

Uncertainty

3.11 There are many components that contribute to the uncertainty of modelling predictions. The road traffic emissions dispersion model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.

3.12 An important stage in the process is model verification, which involves comparing the model output with measured concentrations (see Appendix A4). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of base year (2018) concentrations.

3.13 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions.

3.14 European type approval ('Euro') standards for vehicle emissions apply to all new vehicles manufactured for sale in Europe. These standards have, over many years, become progressively more stringent and this is one of the factors that has driven reductions in both predicted and measured pollutant concentrations over time.

3.15 Historically, the emissions tests used for type approval were carried out within laboratories and were quite simplistic. They were thus insufficiently representative of emissions when driving in the real world. For a time, this resulted in a discrepancy, whereby nitrogen oxides emissions from new diesel vehicles reduced over time when measured within the laboratory, but did not fall in the real world. This, in turn, led to a discrepancy between models (which predicted improvements in nitrogen dioxide concentrations over time) and measurements (which very often showed no improvements year-on-year).

3.16 Recognition of these discrepancies has led to changes to the type approval process. Vehicles are now tested using a more complex laboratory drive cycle and also through 'Real Driving Emissions' (RDE) testing, which involves driving on real roads while measuring exhaust emissions. For Heavy Duty Vehicles (HDVs), the new testing regime has worked very well and NOx emissions from the latest vehicles (Euro VI[2]) are now very low when compared with those from older models (ICCT, 2017).

3.17 For Light Duty Vehicles (LDVs), while the latest (Euro 6) emission standard has been in place since 2015, the new type-approval testing regime only came into force in 2017. Despite this delay, earlier

[2] Euro VI refers to HDVs while Euro 6 refers to LDVs.

work by AQC (2016) showed that Euro 6 diesel cars manufactured prior to 2017 tend to emit significantly less NOx than previous (Euro 5 and earlier) models.

3.18 AQC has analysed trends in measured NOx concentrations against trends in Defra's EFT model predictions for the period 2013 to 2019 (AQC, 2020). This has demonstrated that, while the EFT typically over-stated the improvements over the period 2013 to 2016, it has tended to under-state the improvements since 2016. Wider consideration of the assumptions built into the EFT suggests that, on balance, the EFT is unlikely to over-state the rate at which NOx emissions decline in the future at an 'average' site in the UK. In practice, the balance of evidence thus suggests that NOx concentrations are most likely to decline more quickly in the future, on average, than predicted by the EFT, especially against a base year of 2016 or later. Using EFT v9.0 for future-year forecasts in this report thus provides a robust assessment, given that the model has been verified against measurements made in 2018.

4 Site Description and Baseline Conditions

4.1 The proposed development site is located approximately 400 m to the south west of Dover town centre and is 800 m from the nearest major port terminal. The site is bounded to the south by offices, to the west by a Hertz car rental facility, to the east by the A256 and to the north by Adrian Street, adjacent to which are existing residential properties and a church hall. The site currently consists of a car park and night club.

Industrial sources

4.2 A search of the UK Pollutant Release and Transfer Register (Defra, 2020a) has not identified any significant industrial or waste management sources that are likely to affect the proposed development, in terms of air quality. The two nearest potential sources, Dover Household Waste Recycling Centre and Broomfield Bank Water Treatment Works, are both situated over 3.5 km away, and there are existing residential dwellings significantly closer.

4.3 The Dover District Council Annual Status Report (ASR) (Dover District Council, 2019) highlights regular cross-channel ship movements as a source of pollutant emissions. Whilst emissions relating to ship movements have not explicitly been included in the modelling undertaken for this assessment, they have been indirectly accounted for in the background pollutant values used to determine total concentrations. In addition, traffic related emissions attributed by the operation of Ports are considered to be included in the traffic data provided by DfT. The model verification process, which determines any under-prediction in modelled values when compared to local measurements, also takes account of contributions from sources not explicitly modelled.

Air Quality Management Areas

4.4 Dover District Council has investigated air quality within its area as part of its responsibilities under the LAQM regime. In 2004 an AQMA was declared, encompassing some of the A20, from beyond the Limekiln Roundabout to the Eastern Dock, for exceedances of the annual mean nitrogen dioxide objective; the boundary was most recently amended in 2009. The High Street/Ladywell AQMA, declared in 2007, encompasses roads and properties between the Effingham Crescent/High Street junction and Priory Hill/High Street junction. The proposed development site is situated within the A20 AQMA, while the latter is 500 m northwest of the development. The declared AQMAs are shown in Figure 2.

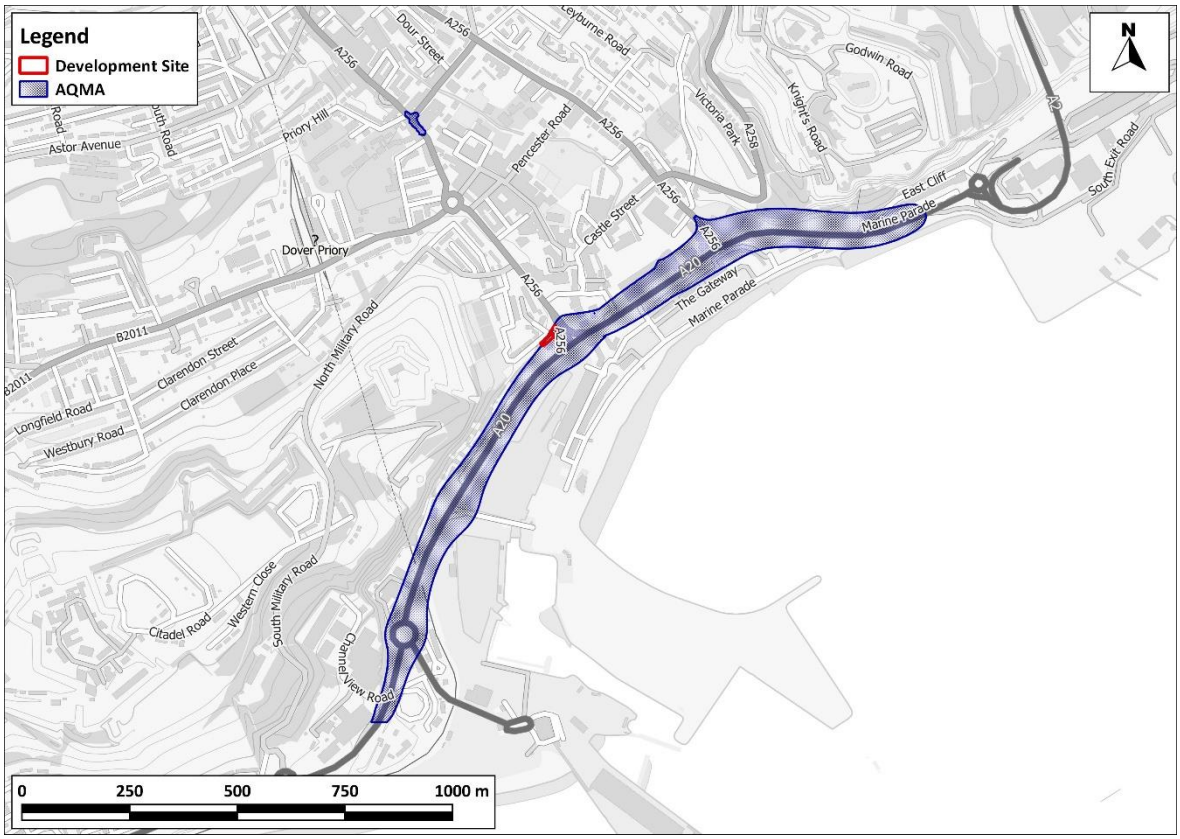

Figure 2: Declared AQMAs

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Local Air Quality Monitoring

4.5 Dover District Council does not operate any automatic monitoring of nitrogen dioxide within its area. The Council does however operate a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by SOCOTEC Didcot (using the 50% TEA[3] in acetone method). These include three situated alongside the A20, on Snargate Street. Data for these sites have been taken from Dover District Council's 2018 and 2019 ASRs. Results for the years 2013 to 2018 are summarised in Table 3 and the monitoring locations are shown in Figure 3.

[3] Triethanolamine - used to absorb nitrogen dioxide

Table 3: Summary of Nitrogen Dioxide (NO_2) Monitoring (2013-2018) [a, b]

Site No.	Site Type	Location	2013	2014	2015	2016	2017	2018
Diffusion Tubes - Annual Mean (µg/m³)								
DV23	Roadside	126 Snargate Street, Dover, Kent, CT17 9BZ	**52.0**	**44.9**	**43.2**	36.1	38.0	34.3
DV24	Roadside	148 Snargate Street, Dover, Kent, CT17 9BZ	**51.0**	**50.3**	**49.1**	38.4	**42.8**	39.0
DV25	Roadside	167 Snargate Street, Dover, Kent, CT17 9BZ	38.0	39.6	39.4	35.1	35.4	32.6
Objective			**40**					

[a] Exceedances of the objectives are shown in bold.

[b] Data taken from Dover Annual Status Reports 2018 (Dover District Council, 2019) and 2019 (Dover District Council, 2018).

[c] Data for the years 2013 to 2017 have been provided only for context. Significant roadworks occurred along the A20 in 2016-2017, altering the road layout. Hence traffic and pollutant concentrations are expected to be greater during this period and are not representative of current air quality.

4.6 Measured concentrations indicate that air quality alongside the A20 has improved since 2013 at each of the three monitoring sites. Concentrations at DV23 and DV24 exceeded the annual mean objective in a number of recent years, however, by 2018, concentrations were below the annual mean objective.

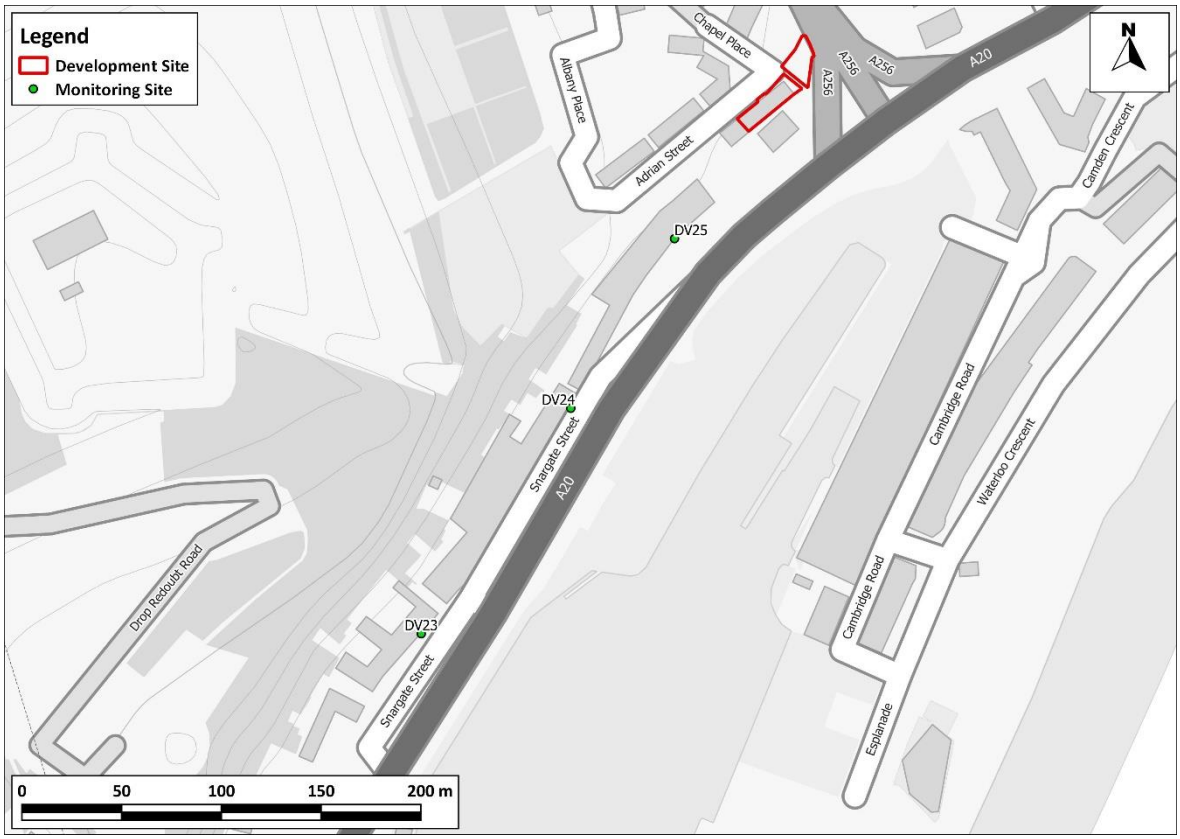

Figure 3: Monitoring Locations

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4.7 Dover District Council undertake PM_{10} monitoring at one location, approximately 450 m northeast of the proposed development, located at the A20 Townwall Street, A256 Woolcomber Street junction. Measured concentrations at this site have consistently been well below the relevant objectives in all recent years. No monitoring of $PM_{2.5}$ concentrations is currently undertaken by Dover District Council.

Table 4: Summary of PM_{10} Automatic Monitoring (2014-2018) [a]

Site ID	Site Type	Location	2014	2015	2016	2017	2018
PM_{10} Annual Mean (µg/m^3)							
Dover Centre	Roadside	A20 Townwall Street, Dover	25	22	26	27	26
Objective			**40**				
PM_{10} No. Days >50 µg/m^3							
Dover Centre	Roadside	A20 Townwall Street, Dover	13	2	10	20	7
Objective			**35 (50) [b]**				

Exceedances of EU Limit Value

4.8 There are no AURN monitoring sites within 1 km of the development site with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2020c), which are used to report exceedances of the limit value to the EU, do not identify any exceedances within 1 km of the development site in 2017 or 2021. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational.

Background Concentrations

4.9 Estimated background concentrations at the proposed development have been determined for 2018 and the opening year 2021 using Defra's 2017-based background maps (Defra, 2020b). The background concentrations are set out in Table 5 and have been derived as described in Appendix A4. The background concentrations are all well below the objectives.

Table 5: Estimated Annual Mean Background Pollutant Concentrations in 2018 and 2021 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2018	20.4	15.3	10.5
2021	18.2	14.8	10.1
Objectives	**40**	**40**	**25** [a]

[a] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

5 Construction Phase Impact Assessment

5.1 The construction works will give rise to a risk of dust impacts during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. Step 1 of the assessment procedure is to screen the need for a detailed assessment. There are receptors within the distances set out in the guidance (see Appendix A1), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

5.2 Construction activities for the development have not been confirmed. Where information is missing, reasonable worst-case assumptions have been made.

Potential Dust Emission Magnitude

Demolition

5.3 There will be a requirement to demolish one existing brick building with an approximate total volume of 3,000 m^3. Based on the example definitions set out in Table A1.1 in Appendix A1, the dust emission class for demolition is considered to be *small.*

Earthworks

5.4 The characteristics of the soil at the development site have been defined using the British Geological Survey's UK Soil Observatory website (British Geological Survey, 2020), as set out in Table 6. Overall, it is considered that, when dry, this soil has the potential to be moderately dusty.

Table 6: Summary of Soil Characteristics

Category	Record
Soil Layer Thickness	Deep
Soil Parent Material Grain Size	Mixed (Arenaceous [a] – Rudaceous [b])
European Soil Bureau Description	Quaternary Marine/Estuarine Sand
Soil Group	Light
Soil Texture	Sand to Sandy Loam

[a] grain size 0.06 – 2.0 mm.

[b] grain size > 2.0 mm.

5.5 The site covers approximately 550 m^2 and most of this will be subject to earthworks, involving removal of the foundations of the existing building and removal of hard standing. Dust may arise from vehicles travelling over unpaved ground and from the handling of dusty materials (such as dry soil). Based on the example definitions set out in Table A1.1 in Appendix A1, the dust emission class for earthworks is considered to be *small*.

Construction

5.6 Construction will involve two brick built residential apartment blocks, with a total building volume of less than 9,000 m^3. Dust may arise from vehicles travelling over unpaved ground and the handling and storage of dusty materials. Based on the example definitions set out in Table A1.1 in Appendix A1, the dust emission class for construction is considered to be *small*.

Trackout

5.7 The number of heavy vehicles accessing the site, which may track out dust and dirt, is currently unknown, but given the small size of the site it is likely that there will be a maximum of 5 outward heavy vehicle movements per day. Based on the example definitions set out in Table A1.1 in Appendix A1, the dust emission class for trackout is considered to be *small*.

5.8 Table 7 summarises the dust emission magnitude for the proposed development.

Table 7: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Demolition	Small
Earthworks	Small
Construction	Small
Trackout	Small

Sensitivity of the Area

5.9 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM_{10} concentrations.

Sensitivity of the Area to Effects from Dust Soiling

5.10 The IAQM guidance, explains that residential properties are 'high' sensitivity receptors to dust soiling, while places of work are 'low' sensitivity receptors (Table A1.2 in Appendix A1). There are under 10 residential dwellings, including terraced houses and apartments, and an office building within 20 m of the development site. There are approximately 30 residential properties within 50 m of the site, as well as the office building and a church hall (see Figure 4). Using the matrix set out in Table A1.3 in Appendix A1, the area surrounding the onsite works is of 'medium' sensitivity to dust soiling.

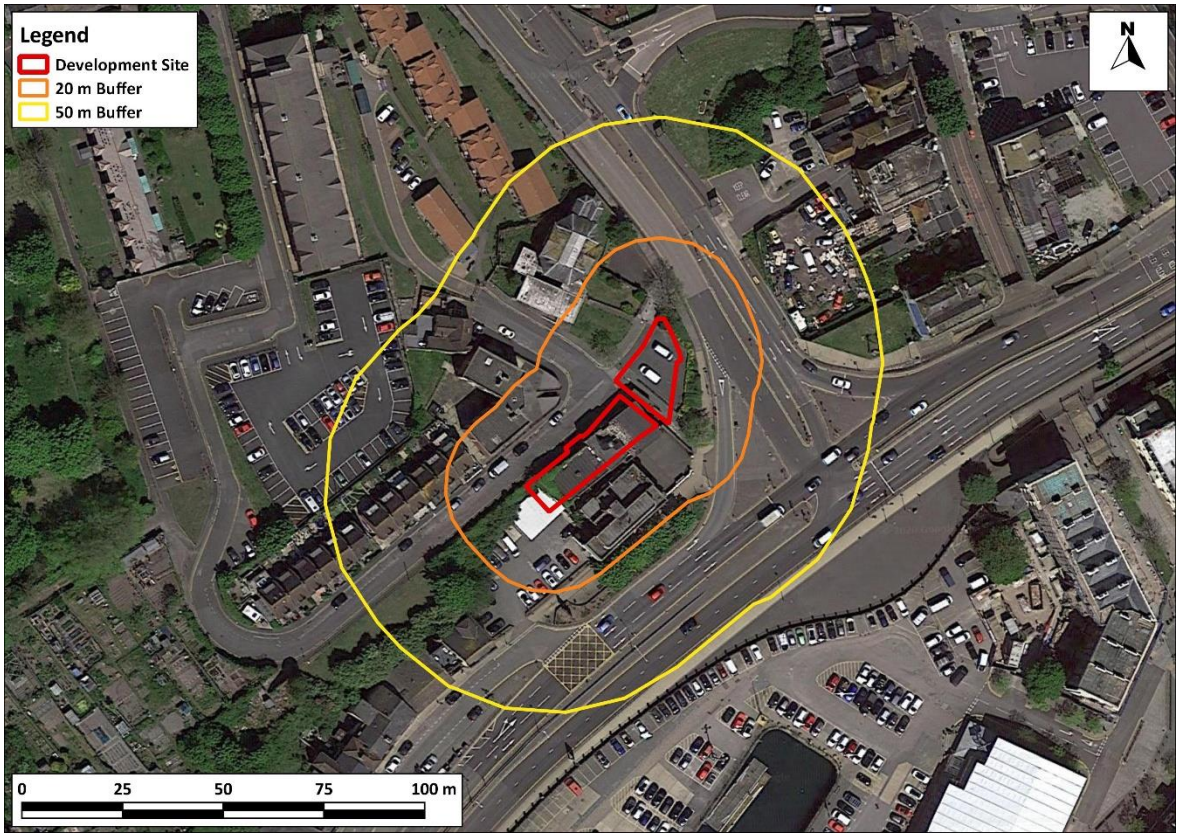

Figure 4: 20 m and 50 m Distance Bands around Site Boundary

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5.11 Table 7 shows that the dust emission magnitude for trackout is *small* and Table A1.3 in Appendix A1 thus explains that there is a risk of material being tracked 50 m from the site exit. Since it is not known where vehicles will access the site from, it has been assumed that vehicles will exit from the length of the site onto Adrian Street. There are approximately 40 residential properties within 50 m of the roads along which material could be tracked (see Figure 5), and Table A1.3 in Appendix A1 thus indicates that the area is of 'high' sensitivity to dust soiling due to trackout.

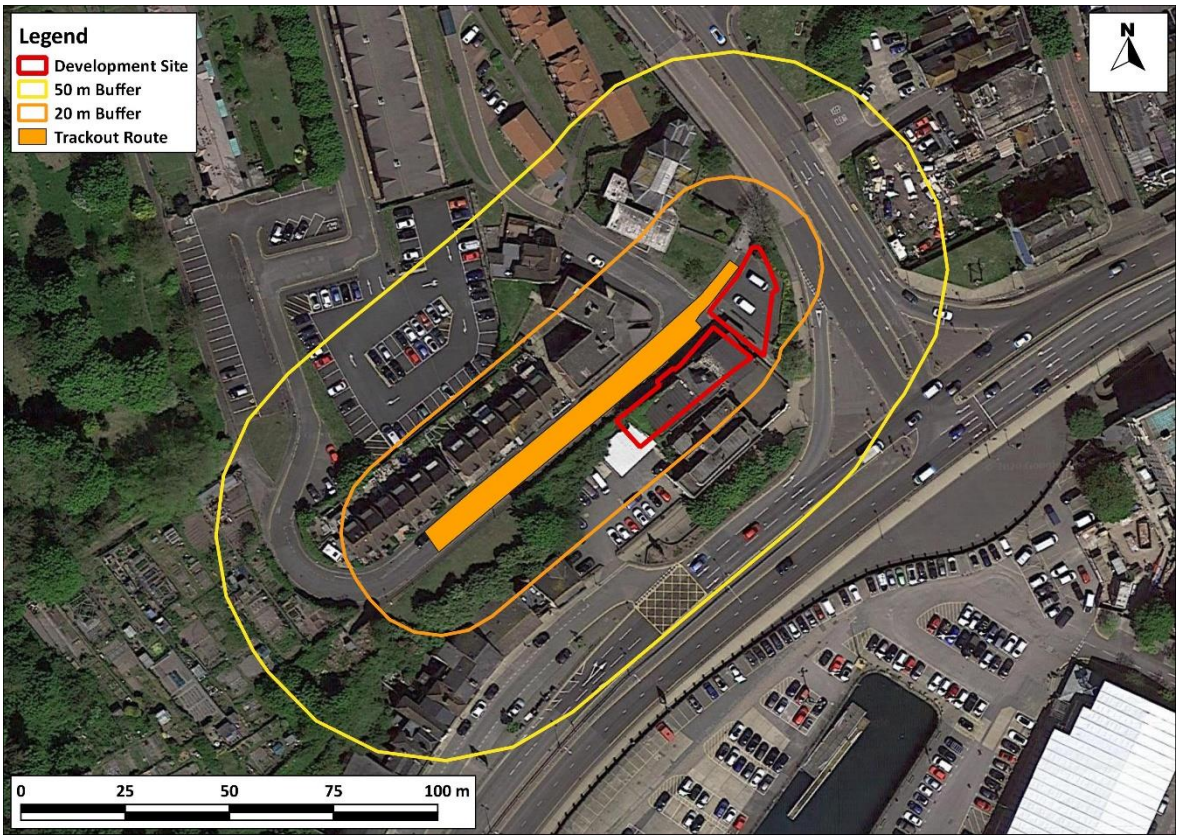

Figure 5: 20 and 50 m Distance Bands around Roads Used by Construction Traffic Within 50 m of the possible Site Exits

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Sensitivity of the Area to any Human Health Effects

5.12 Residential properties are also classified as being of 'high' sensitivity to human health effects, while places of work are classified as being of 'medium' sensitivity. The matrix in Table A1.4 in Appendix A1 requires information on the baseline annual mean PM_{10} concentration in the area. It is considered that the baseline PM_{10} concentrations at the places of work adjacent to the proposed development site will be similar to measured roadside concentrations, which are well below the annual mean objective in 2018; baseline PM_{10} concentrations at the nearby residential properties are judged to close to background concentrations (Table 5), and below 24 µg/m^3. Using the matrix in Table A1.4 in Appendix A1, the areas surrounding onsite works and trackout routes are of 'low' sensitivity to human health effects.

Sensitivity of the Area to any Ecological Effects

5.13 The guidance only considers designated ecological sites within 50 m to have the potential to be impacted by the construction works. The nearest designated ecological site, the Western Heights Local Nature Reserve, is situated over 100 m from the nearest trackout route and over 150 m form the development site itself. As such, ecological impacts will not be considered further.

Summary of the Area Sensitivity

5.14 Table 8 summarises the sensitivity of the area around the proposed construction works.

Table 8: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	Medium Sensitivity	High Sensitivity
Human Health	Low Sensitivity	Low Sensitivity

Risk and Significance

5.15 The dust emission magnitudes in Table 7 have been combined with the sensitivities of the area in Table 8 using the matrix in Table A1.6 in Appendix A1, in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 9. These risk categories have been used to determine the appropriate level of mitigation as set out in Section 7 (step 3 of the assessment procedure).

Table 9: Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling	Human Health
Demolition	Low Risk	Negligible
Earthworks	Low Risk	Negligible
Construction	Low Risk	Negligible
Trackout	Low Risk	Negligible

5.16 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant' (IAQM, 2016).

6 Operational Phase Impact Assessment

6.1 Predicted air quality conditions for future residents of the proposed development, taking account of emissions from the adjacent road network, are set out in Table 10 for Receptors 1 to 10 (see Table 2 and Figure 1 for receptor locations). For each receptor, results are presented for the lowest height at which predictions have been made; concentrations at floors at a greater height are lower than those presented for each receptor. All of the values are below the objectives. Air quality for future residents within the development will thus be acceptable.

Table 10: Predicted Concentrations of Nitrogen Dioxide (NO_2), PM_{10} and $PM_{2.5}$ in 2021 for New Receptors in the Development Site

Receptor	Annual Mean NO_2 ($\mu g/m^3$)	Annual Mean PM_{10} ($\mu g/m^3$)	Annual Mean $PM_{2.5}$ ($\mu g/m^3$)
1	36.3	18.6	12.3
2	37.2	18.8	12.4
3	34.7	18.4	12.2
4	34.8	18.4	12.2
5	31.5	17.7	11.8
6	29.4	17.3	11.5
7	25.9	16.7	11.2
8	26.7	16.8	11.3
9	25.0	16.5	11.1
10	25.7	16.6	11.1
Objective / Criterion	**40**	**32** [a]	**25** [b]

[a] While the annual mean PM_{10} objective is 40 $\mu g/m^3$, 32 $\mu g/m^3$ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG16 (Defra, 2018b). A value of 32 $\mu g/m^3$ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Significance of Operational Air Quality Effects

6.2 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A2, and takes account of the assessment that pollutant concentrations within the proposed development will all be below the objectives, thus future residents will experience acceptable air quality. In addition, that the development itself will not generate any significant emissions and will have an insignificant effect on local air quality.

7 Mitigation

Mitigation Included by Design

7.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The proposed development incorporates the following good design and best practice measures:

- adoption of a Dust Management Plan (DMP) or Construction Environmental Management Plan (CEMP) to minimise the environmental impacts of the construction works;
- provision of no new car parking spaces, to discourage the use of private vehicles to access the proposed development; and
- provision of pedestrian and cycle access to the new development, including cycle parking.

Recommended Mitigation

Construction Impacts

7.2 Measures to mitigate dust emissions will be required during the construction phase of the development in order to minimise effects upon nearby sensitive receptors.

7.3 The site has been identified as a *Low* Risk site during demolition, earthworks and construction, and trackout, as set out in Table 9. Comprehensive guidance has been published by IAQM (2016) that describes measures that should be employed, as appropriate, to reduce the impacts, along with guidance on monitoring during demolition and construction (IAQM, 2018). This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment and the findings of the assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix A5.

7.4 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Road Traffic Impacts

7.5 The assessment has demonstrated that future residents of the proposed development will be exposed to air of an acceptable quality, and will not generate any significant emissions. It is, therefore, not considered appropriate to propose further mitigation measures for this development.

7.6 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law).

8 Residual Impacts and Effects

Construction

8.1 The IAQM guidance is clear that, with appropriate mitigation in place, the residual effects will normally be 'not significant'. The mitigation measures set out in Section 7 and Appendix A5 are based on the IAQM guidance. With these measures in place and effectively implemented the residual effects are judged to be 'not significant'.

8.2 The IAQM guidance does, however, recognise that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. During these events, short-term dust annoyance may occur, however, the scale of this would not normally be considered sufficient to change the conclusion that overall the effects will be 'not significant'.

Road Traffic Impacts

8.3 The residual impacts will be the same as those identified in Section 6. The overall effects of the proposed development will be 'not significant'.

9 Conclusions

9.1 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emissions. With these measures in place, it is expected that any residual effects will be 'not significant'.

9.2 The impact of traffic emissions from local roads on the air quality for future residents has been assessed at ten worst-case locations within the new development. The effects of local traffic on air quality for residents living in the proposed development have been shown to be acceptable at all locations assessed, with concentrations being below the air quality objectives. Hence, the overall operational air quality effects of the development are judged to be 'not significant'.

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11 Glossary

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System model for Roads
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
EU	European Union
EV	Electric Vehicle
GLA	Greater London Authority
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMSO	Her Majesty's Stationery Office
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
kph	Kilometres Per hour
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
LGV	Light Goods Vehicle
µg/m^3	Microgrammes per cubic metre

NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
RDE	Real Driving Emissions
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide
TEMPro	Trip End Model Presentation Program
WHO	World Health Organisation

12 Appendices

A1 Construction Dust Assessment Procedure

A1.1 The criteria developed by IAQM (2016) divide the activities on construction sites into four types to reflect their different potential impacts. These are:

- demolition;
- earthworks;
- construction; and
- trackout.

A1.2 The assessment procedure includes the four steps summarised below:

STEP 1: Screen the Need for a Detailed Assessment

A1.3 An assessment is required where there is a human receptor within 350 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), or where there is an ecological receptor within 50 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

A1.4 Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is *negligible* and that any effects will be 'not significant'. No mitigation measures beyond those required by legislation will be required.

STEP 2: Assess the Risk of Dust Impacts

A1.5 A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude (Step 2A); and
- the sensitivity of the area to dust effects (Step 2B).

A1.6 These two factors are combined in Step 2C, which is to determine the risk of dust impacts with no mitigation applied. The risk categories assigned to the site may be different for each of the four potential sources of dust (demolition, earthworks, construction and trackout).

Step 2A – Define the Potential Dust Emission Magnitude

A1.7 Dust emission magnitude is defined as either 'Small', 'Medium', or 'Large'. The IAQM guidance explains that this classification should be based on professional judgement, but provides the examples in Table A1.1.

Table A1.1: Examples of How the Dust Emission Magnitude Class May be Defined

Class	Examples
Demolition	
Large	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >20 m above ground level
Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level
Small	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes
Medium	Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes
Small	Total site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10,000 tonnes, earthworks during wetter months
Construction	
Large	Total building volume >100,000 m^3, piling, on site concrete batching; sandblasting
Medium	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching
Small	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout [a]	
Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m
Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

[a] These numbers are for vehicles that leave the site after moving over unpaved ground.

Step 2B – Define the Sensitivity of the Area

A1.8 The sensitivity of the area is defined taking account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}, the local background concentration; and
- site-specific factors, such as whether there are natural shelters to reduce the risk of wind-blown dust.

A1.9 The first requirement is to determine the specific sensitivities of local receptors. The IAQM guidance recommends that this should be based on professional judgment, taking account of the principles in Table A1.2. These receptor sensitivities are then used in the matrices set out in Table A1.3, Table A1.4 and Table A1.5 to determine the sensitivity of the area. Finally, the sensitivity of the area is considered in relation to any other site-specific factors, such as the presence of natural shelters etc., and any required adjustments to the defined sensitivities are made.

Step 2C – Define the Risk of Impacts

A1.10 The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the *risk* of impacts with no mitigation applied. The IAQM guidance provides the matrix in Table A1.6 as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

A1.11 The IAQM guidance provides a suite of recommended and desirable mitigation measures which are organised according to whether the outcome of Step 2 indicates a low, medium, or high risk. The list provided in the IAQM guidance has been used as the basis for the requirements set out in Appendix A5.

STEP 4: Determine Significant Effects

A1.12 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant'.

A1.13 The IAQM guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be 'not significant'.

Table A1.2: Principles to be Used When Defining Receptor Sensitivities

Class	Principles	Examples
Sensitivities of People to Dust Soiling Effects		
High	users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected a to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land	dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms
Medium	users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land	parks and places of work
Low	the enjoyment of amenity would not reasonably be expected; or there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land	playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads
Sensitivities of People to the Health Effects of PM_{10}		
High	locations where members of the public may be exposed for eight hours or more in a day	residential properties, hospitals, schools and residential care homes
Medium	locations where the people exposed are workers, and where individuals may be exposed for eight hours or more in a day.	may include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}
Low	locations where human exposure is transient	public footpaths, playing fields, parks and shopping streets
Sensitivities of Receptors to Ecological Effects		
High	locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species	Special Areas of Conservation with dust sensitive features
Medium	locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition	Sites of Special Scientific Interest with dust sensitive features
Low	locations with a local designation where the features may be affected by dust deposition	Local Nature Reserves with dust sensitive features

Table A1.3: Sensitivity of the Area to Dust Soiling Effects on People and Property [4]

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

[4] For demolition, earthworks and construction, distances are taken either from the dust source or from the boundary of the site. For trackout, distances are measured from the sides of roads used by construction traffic. Without mitigation, trackout may occur from roads up to 500 m from sites with a *large* dust emission magnitude for trackout, 200 m from sites with a *medium* dust emission magnitude and 50 m from sites with a *small* dust emission magnitude, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Table A1.4: Sensitivity of the Area to Human Health Effects [4]

Receptor Sensitivity	Annual Mean PM_{10}	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A1.5: Sensitivity of the Area to Ecological Effects [4]

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

Table A1.6: Defining the Risk of Dust Impacts

Sensitivity of the Area	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			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

A2 EPUK & IAQM Planning for Air Quality Guidance

A2.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations".*

Recommended Best Practice

A2.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".

A2.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m^2 of commercial floorspace;
- are carried out on land of 1 ha or more.

A2.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
    - Spark ignition engine: 250 mgNOx/Nm^3;
    - Compression ignition engine: 400 mgNOx/Nm^3;
    - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A2.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

A2.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

Impacts of the Development on the Local Area

A2.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

A2.8 Coupled with any of the following:

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

A2.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A2.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A2.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

A2.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

A2.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".

A2.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

A2.15 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. The guidance is that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;

- the potential for cumulative impacts. In such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A2.16 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant.

A2.17 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A3.

A3 Professional Experience

Guido Pellizzaro, BSc (Hons) MIAQM MIEnvSc PIEMA

Mr Pellizzaro is an Associate Director with AQC, with more than 14 years' experience in the field of air quality management and assessment. His main experience relates to managing and delivering air quality assessments for major planning applications and EIA development. Guido is a Member of the Institute of Environmental Sciences and of the Institute of Air Quality Management, and a Practitioner of the Institute of Environmental Management and Assessment.

Dr Denise Evans, BSc (Hons) PhD MIEnvSc MIAQM

Dr Evans is an Associate Director with AQC, with more than 20 years' relevant experience. She has prepared air quality review and assessment reports for local authorities, and has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has extensive modelling experience, completing air quality and odour assessments to support applications for a variety of development sectors including residential, mixed use, urban regeneration, energy, commercial, industrial, and road schemes, assessing the effects of a range of pollutants against relevant standards for human and ecological receptors. Denise also has experience of completing assessments for the purposes of Permit applications. She has acted as an Expert Witness and is a Member of the Institute of Air Quality Management.

Jamie Dennis, MSci (Hons) AMIAQM AMIEnvSc

Mr Dennis is an Assistant Consultant with AQC, having joined the company in December 2019. Prior to joining, he completed an MSci degree in Chemistry at the University of Bristol, specialising in the regional modelling of trace gases. He is now gaining experience in the field of air quality monitoring and assessment.

A4 Modelling Methodology

Model Inputs

A4.1 Predictions have been carried out using the ADMS-Roads dispersion model (v4.1). The model requires the user to provide various input data, including emissions from each section of road and the road characteristics (such as road width). Vehicle emissions have been calculated based on vehicle flow, composition and speed data using the EFT (Version 9.0) published by Defra (2020b).

A4.2 Hourly sequential meteorological data from Landon Bay for 2018 have been used in the model. The Langdon Bay meteorological monitoring station is located at the Maritime Rescue Co-Ordination Centre, approximately 2.4 km northeast of the proposed development site. It is the nearest monitoring station and is considered representative of meteorological conditions in the vicinity of the proposed development site; both the development site and the Langdon Bay meteorological monitoring station are located at coastal locations on the south east coast of England where they will be influenced by the effects of coastal meteorology.

A4.3 AADT flows, and the proportions of HDVs, for the A20 and A256 adjacent to the proposed development site have been determined from the interactive web-based map provided by DfT (2020). The 2018 AADT flows have been factored forwards to the assessment year of 2021 using growth factors derived using the TEMPro System v7.2 (DfT, 2017). Traffic speeds have been estimated based on professional judgement, taking account of the road layout, speed limits and the proximity to a junction. The traffic data used in this assessment are summarised in Table A4.1. Diurnal and monthly flow profiles for the traffic have been derived from the national profiles published by DfT (2019).

Table A4.1: Summary of Traffic Data used in the Assessment [a]

Road Link	Direction	AADT	% Car	% LGV	% Rigid HGV	% Artic HGV	% Bus/ Coach	% Motor Cycle
2018								
A20 - East of A256	North	12983	69.51	13.87	2.93	11.51	1.16	1.02
	South	12993	70.64	13.35	2.53	10.79	1.68	1.01
A20 - West of A256	North	9928	65.39	15.89	3.43	13.48	0.92	0.89
	South	11003	70.15	16.14	2.96	9.25	0.72	0.77
A256	North	7877	84.93	11.55	0.94	0.75	0.86	0.96
	South	3444	83.97	11.96	0.78	0.35	1.60	1.34
2021								
A20 - East of A256	North	13569	69.51	13.87	2.93	11.51	1.16	1.02
	South	13579	70.64	13.35	2.53	10.79	1.68	1.01
A20 - West of A256	North	10376	65.39	15.89	3.43	13.48	0.92	0.89
	South	11499	70.15	16.14	2.96	9.25	0.72	0.77
A256	North	8232	84.93	11.55	0.94	0.75	0.86	0.96
	South	3599	83.97	11.96	0.78	0.35	1.60	1.34

[a] This is just a summary of the data used to calculate the emissions entered into the model. Detailed composition data for motorcycles, cars, buses and coaches, Light Goods Vehicles, and rigid and articulated Heavy Goods Vehicles have been used.

A4.4 Figure A4.1 shows the road network included within the model, along with the speed at which each link was modelled.

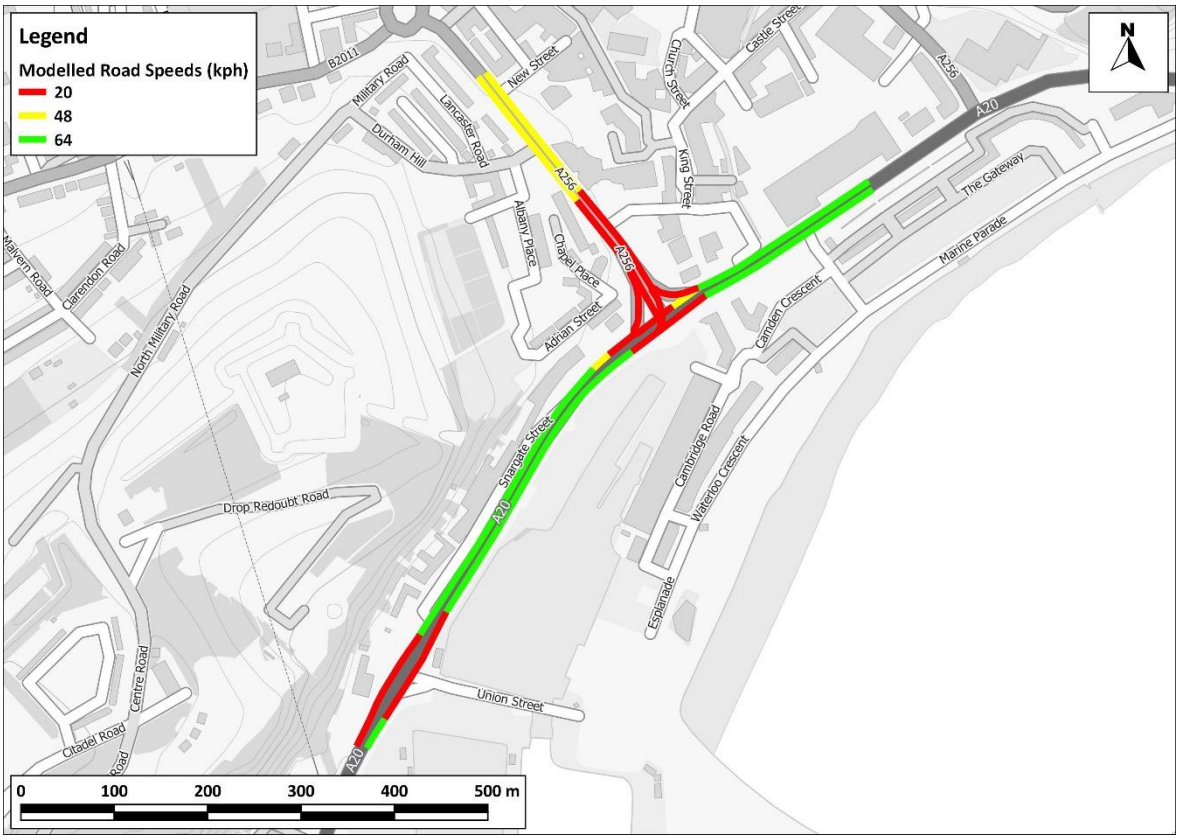

Figure A4.1: Modelled Road Network & Speed

Background Concentrations

A4.5 The nitrogen dioxide background maps for 2018 have been calibrated against local measurements made at the urban background diffusion tube monitoring site, DV04. The measured nitrogen dioxide concentration at this site in 2018 was 16.2 µg/m^3, while the mapped background for the grid square within which it lies was 11.2 µg/m^3. All mapped background nitrogen dioxide concentrations have therefore been calibrated by applying a factor of 1.452. Mapped background concentrations of PM_{10} and $PM_{2.5}$ have not been adjusted.

Model Verification

A4.6 In order to ensure that ADMS-Roads accurately predicts local concentrations, it is necessary to verify the model against local measurements.

Nitrogen Dioxide

A4.7 Most nitrogen dioxide (NO_2) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NOx = NO + NO_2). The model has been run to predict the annual mean NOx concentrations during 2018 at monitoring sites DV23, DV24 and DV25. Concentrations have been modelled at heights of 2.0, 2.0 and 2.5 m respectively, the height of each monitor.

A4.8 The model output of road-NOx (i.e. the component of total NOx coming from road traffic) has been compared with the 'measured' road-NOx. Measured road-NOx has been calculated from the measured NO_2 concentrations and the predicted background NO_2 concentration using the NOx from NO_2 calculator (Version 7.1) available on the Defra LAQM Support website (Defra, 2020b).

A4.9 The unadjusted model has under predicted the road-NOx contribution; this is a common experience with this and most other road traffic emissions dispersion models. An adjustment factor has been determined as the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution, forced through zero (Figure A4.2). The calculated adjustment factor of 8.257 has been applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations.

A4.10 The total nitrogen dioxide concentrations have then been determined by combining the adjusted modelled road-NOx concentrations with the predicted background NO_2 concentration within the NOx to NO_2 calculator. Figure A4.3 compares final adjusted modelled total NO_2 at each of the monitoring sites to measured total NO_2, and shows a close agreement.

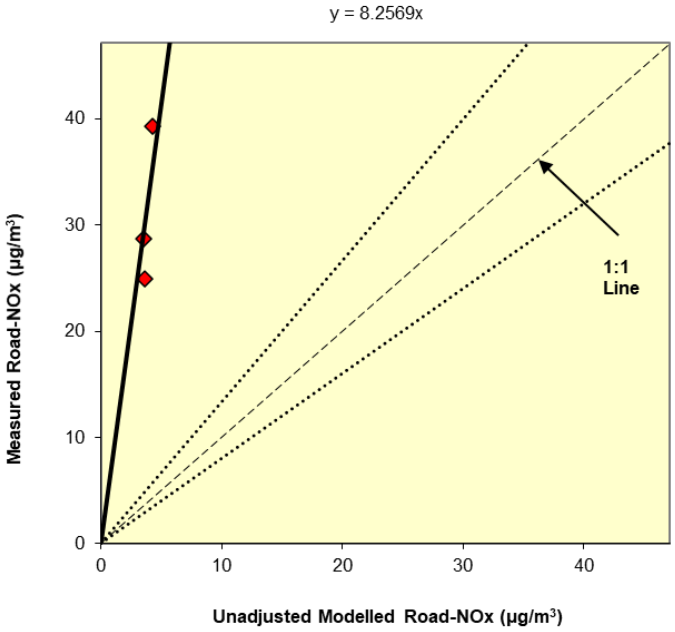

Figure A4.2: Comparison of Measured Road NOx to Unadjusted Modelled Road NOx Concentrations. The dashed lines show ± 25%.

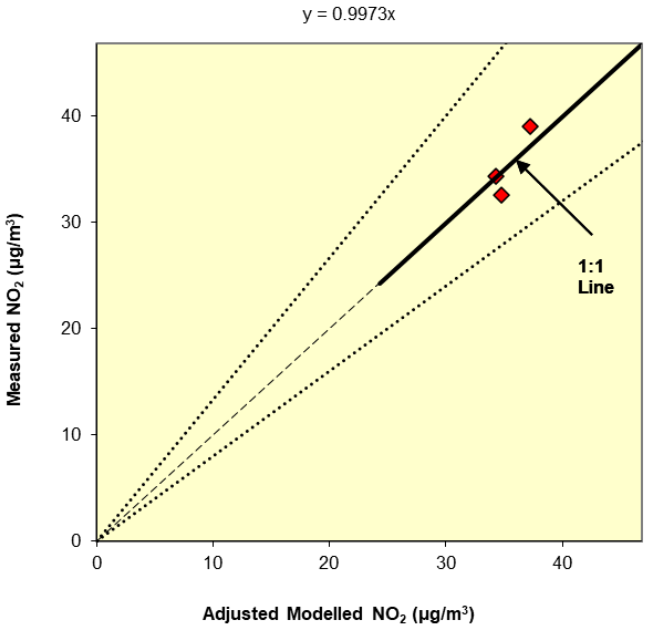

Figure A4.3: Comparison of Measured Total NO_2 to Final Adjusted Modelled Total NO_2 Concentrations. The dashed lines show ± 25%.

A4.11 While every effort has been made to reduce the uncertainties within the model and thus reduce the verification factor as much as possible, having reviewed the modelling inputs and assumptions made, no further refinements to the modelling can be made. Overall, it is concluded that with the

adjustment factor applied the model is performing well and modelled results are considered to be suitable to determine local air quality at the site.

PM_{10} and $PM_{2.5}$

A4.12 The approach to verification was agreed with Dover Council. Consequently, there are no PM_{10} or $PM_{2.5}$ monitors within the study area. It has therefore not been possible to verify the model for PM_{10} or $PM_{2.5}$. The model outputs of road-PM_{10} and road-$PM_{2.5}$ have therefore been adjusted by applying the adjustment factor calculated for road NOx. A brief comparison with modelled versus measured values suggests that the model has predicted PM_{10} concentrations in the area to a good degree.

Model Post-processing

A4.13 The model predicts road-NOx concentrations at each receptor location. These concentrations have been adjusted using the adjustment factor set out above, which, along with the background NO_2, has been processed through the NOx to NO_2 calculator available on the Defra LAQM Support website (Defra, 2020b). The traffic mix within the calculator has been set to "All other urban UK traffic", which is considered suitable for the study area. The calculator predicts the component of NO_2 based on the adjusted road-NOx and the background NO_2.

A5 Construction Mitigation

A5.1 The following is a set of best-practice measures from the IAQM guidance (IAQM, 2016) that should be incorporated into the specification for the works. These measures should ideally be written into a Dust Management Plan. Some of the measures may only be necessary during specific phases of work, or during activities with a high potential to produce dust, and the list should be refined and expanded upon in liaison with the construction contractor when producing the Dust Management Plan

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 environmental manager/engineer or the site manager; and
- display the head or regional office contact information.

Dust Management Plan

- Develop and implement a DMP approved by the Local Authority which documents the mitigation measures to be applied, and the procedures for their implementation and management.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- make the complaints log available to the local authority when asked; and
- record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

Monitoring

- Undertake daily on-site and off-site inspections where receptors (including roads) are nearby, to monitor dust. Record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary, with cleaning to be provided if necessary;
- carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the Local Authority when asked; and

- increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Preparing and Maintaining the Site

- Plan the site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible;
- erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- avoid site runoff of water or mud;
- keep site fencing, barriers and scaffolding clean using wet methods;
- remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- cover or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off their engines when stationary – no idling vehicles; and
- avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- use enclosed chutes, 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; and
- ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;
- avoid explosive blasting, using appropriate manual or mechanical alternatives; and
- bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces), if possible; and
- 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.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- avoid dry sweeping of large areas; and
- ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.