

THE NORFOLK ESTATE

PROPOSED RESIDENTIAL DEVELOPMENT:

LAND AT TORTINGTON, ARUNDEL

AIR QUALITY ASSESSMENT

REPORT REF - 173483-05

NOVEMBER 2020

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-	Draft	FKL	FKL		
-	FINAL	FKL	FKL	KM	26/11/20

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1.0 INTRODUCTION

Proposed Development

- 1.1 Ardent Consulting Engineers Ltd have been commissioned by The Norfolk Estate to carry out an air quality assessment in support of a planning application for a residential development of 90 homes. The proposed development is located within the Arun District Council (ADC) area.

Scope

- 1.2 This report describes existing air quality within the study area and considers both the suitability of the site for the proposed development and the potential impact of the development on local air quality during both the construction and operational phases.
- 1.3 The main air pollutants of concern related to construction are dust and particulate matter (PM₁₀ and PM_{2.5}) from demolition and construction activities and nitrogen dioxide (NO₂), PM₁₀ and PM_{2.5} from construction vehicle emissions. The pollutants related to the operational phase are associated with road traffic (NO₂, PM₁₀ and PM_{2.5}) and energy plant (NO₂).
- 1.4 Specific details regarding vehicle traffic associated with the construction phase are not yet available, however, it is expected that these will be included within a Construction Environmental Management Plan (CEMP). This document will be prepared and submitted to Arun District Council and will include details of the Heavy Goods Vehicles (HGVs) and other construction related traffic movements such as numbers, routing and times of day that these movements will occur. HGV access will be prevented or minimised where possible within particularly sensitive locations.
- 1.5 There is likely to be significant fluctuation in the numbers of vehicle movements associated with development construction throughout the construction period, with peak periods generally being related to initial demolition and delivery of materials. When HGV movements are averaged over a year (Annual Average Daily Traffic – AADT), these will be significantly lower than peak movements. In addition, vehicle movements associated with construction are typically lower than those associated with the operation of the development, which have been taken into account in this assessment. Taking this into account, along with the implementation of the CEMP, it is considered that any impacts from construction vehicle emissions on local air quality will be temporary and not significant and have therefore been scoped out of this assessment.
- 1.6 The proposed development will not include an energy centre. Therefore an assessment of the effect of such plant has been scoped out.
- 1.7 The assessment has been prepared taking into account relevant local and national guidance, policy and legislation.

Consultation

- 1.8 Consultation has been carried out between Flo Kirk-Lloyd, Principal Air Quality Scientist at ACE and Joanne Lewis Senior Environmental Health Officer at Arun District Council. The scope and approach to the air quality assessment was agreed.

2.0 LEGISLATION, POLICY AND GUIDANCE

National Air Quality Legislation and Strategy

The Air Quality Strategy

- 2.1 The Air Quality Strategy (Defra, 2007) established the policy framework for ambient air quality management in the UK, with the objective of ensuring a quality of ambient air for all that would not pose a significant risk to health or quality of life. This document set out the National Air Quality Objectives (NAQOs) and the policy for achieving them. It followed part IV of the Environment Act (UK Government, 1995) which introduced a system of Local Air Quality Management (LAQM) requiring local authorities to regularly review and assess air quality within their boundary and appraise plans in light of these assessments.
- 2.2 Where a NAQO is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) which should include measures expected to ensure that the NAQOs are met within the AQMA.

National Air Quality Objectives

- 2.3 NAQOs were defined by The Air Quality Strategy (Defra, 2007) and enshrined in regulations by the Air Quality Standards Regulation (Statutory Instrument, 2010, No 1001) Air Quality Standards (Amendment) Regulations (Statutory Instrument, 2016 No. 1184) which implemented the European Union Directive on ambient air quality and cleaner air for Europe (Directive 2008/50/EC).
 - 2.4 This directive consolidated the previous directive relating to ambient air quality assessment and management along with its three daughter directives. The limit values remained unchanged, however, member states were given a time extension for compliance subject to approval. For most pollutants of interest, these documents set out average concentrations as either Objectives or Limit Values, however, for PM_{2.5}, exposure reduction targets were also set.
- 2.5** Relevant objectives are set out in

2.6 **Table** 2-1, below.

Table 2-1: NO₂, PM₁₀ and PM_{2.5} Objectives

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO ₂)	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual mean	40 µg/m ³
Particulate Matter (PM ₁₀)	24-hour mean	50 µg/m ³ not to be exceeded more than 35 ¹ times a year
	Annual mean	40 µg/m ³ ²
Particulate Matter (PM _{2.5})	Annual mean	25 µg/m ³ ³
	Annual mean	20 µg/m ³ ⁴
	Exposure reduction target	15% reduction between 2010 and 2020 at Urban Background sites

- 2.7 Analysis of long-term monitoring data suggests that if the annual mean NO₂ concentration is less than 60 µg/m³ then the 1-hour mean NO₂ objective is unlikely to be exceeded where road transport is the main source of pollution. This concentration has therefore been used in this AQA to screen whether an exceedance of the 1-hour mean objective is likely.
- 2.8 Similarly, an annual mean PM₁₀ concentration of 32 µg/m³ is used to screen whether an exceedance of the daily-mean PM₁₀ objective is likely.
- 2.9 Local Air Quality Management Technical Guidance 2016 (LAQM.TG(16), Defra, 2016) provides guidance to local authorities as to where NAQOs apply. These are summarised in

¹ 7 times a year for Scotland

² 18 µg/m³ for Scotland

³ 12 µg/m³ for Scotland

⁴ Indicative stage 2 limit value post 2020

2.10 **Table 2-2.**

Table 2-2: Relevant Exposure

Averaging Period	Relevant Locations	NAQOs should apply	NAQOs don't usually apply
Annual mean	Where individuals are exposed for a cumulative period of 6 month in a year	Facades of residential properties, schools and hospitals	Gardens, facades of offices, hotels and shops or kerbside sites
24-hour mean	Where individuals are expected to be exposed for 24-hours or longer	As above, with the addition of hotels and gardens of residences	Kerbside sites and areas where the public is unlikely to spend significant time
1-hour mean	Where individuals are expected to spend one hour or longer	As above, with the addition of locations with regular access such as car parks, bus stations, parks and cafes	Locations not publicly accessible or where occupation is not regular

National Air Quality Plan for Nitrogen Dioxide (NO₂) in the UK

- 2.11 The National Air Quality Plan (Defra and DfT, 2017) was written as a joint venture between the Defra and the Department for Transport (DfT) and aims to tackle roadside concentrations of NO₂ in the UK. It includes a number of measures such as those aimed at investing in Ultra Low Emission Vehicles (ULEVs) charging infrastructure, public transport and grants to help local authorities in improving air quality.
- 2.12 The plan requires all local authorities (LAs) in England with areas expected not to meet the Limit Values by 2020 (known as 'air quality hotspots') to develop plans to bring concentrations within these values in "*the shortest time possible*". These plans are to be reviewed by the government and suggestions included in the plan include actions such as utilising retrofitting technologies, changing road layout and encouraging public transport and ULEV use. Where these approaches are not considered sufficient, the LA may need to consider implementation of a Clean Air Zone (CAZ) which places restrictions on vehicle access to an area and may include charging certain (or all) vehicles or restrictions on the type of vehicle allowed to access an area.

The Road to Zero Strategy

- 2.13 The 'Road to Zero' strategy (HM Government, 2018) set out the governments aims regarding zero emissions vehicles. These include the aim that all new cars and vans have zero tailpipe emissions by 2040 and for almost every car to be zero

emission by 2050. Measures are aimed at encouraging uptake of the cleanest vehicles and support electric charging infrastructure.

Clean Air Strategy

- 2.14 The Clean Air Strategy (Defra, 2019) sets out policies to lower national emissions of pollutants in order to reduce background pollution and human exposure. It aims to create a strong framework to tackle air pollution and to reduce the number of people living in locations with PM_{2.5} concentrations exceeding 10 µg/m³ by 50% by 2025.

Planning Policy and Guidance

National Planning Policy

- 2.15 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019) sets out the Government's planning policies for England and how they expect these to be implemented. Consideration of air quality within planning is considered an important element of this framework which recommends that transport and the potential impact on the environment should be considered at an early stage in order to allow for mitigation or even avoidance of impacts through location and layout of developments.
- 2.16 It is recommended that both the impacts of a potential development on the environment and the risk to new development from existing pollution be taken into account when planning policy is drafted and specified contributing to compliance with relevant limit values or objectives and should be consistent with any local AQMP.
- 2.17 The NPPF also recommends that *"existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*
- 2.18 Planning Practice Guidance (PPG) provides guidance on how planning can enact the policies set out in NPPF. It is set out as separate papers for different sectors and therefore PPG Air Quality (Ministry of Housing, Communities and Local Government, 2019) is aimed at addressing policy relating specifically to air quality. This document gives guidelines for when air quality is likely to be relevant to a planning decision:

"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."

- 2.19 PPG Air Quality also states that more detailed information such as whether the development could have a significant impact on air quality, baseline air quality and whether occupiers of the development could experience poor air quality may be required in order to make an informed decision. Further, it notes that any assessment should be proportionate, taking into account the scale of the proposed development, as well as any potential impacts.
- 2.20 Some suggestions on mitigation measures are set out within the PPG, such as separation distances, filtration/ventilation, green infrastructure, promotion of low emission forms of transport, control of dust and emissions from construction and, finally, contributing funding to measures such as those identified in AQMPs to offset impacts from the development.

Regional Policy and Guidance

- 2.21 Air quality and emissions mitigation guidance for Sussex (Sussex-air Partnership, 2020) was developed to provide clarity and advice regarding how assessment and mitigation within the County should be applied. It aims to ensure consistency between developers and the local authorities to improve both air quality and the planning process. This guidance outlines four steps to be followed by developers:

Step 1: Pre-application. Discussions with the local authority to identify whether the development is in or close to an AQMA or potential AQMA or is considered to be a major development.

Step 2: Screening checklist. This is used to identify whether emissions mitigation, air quality assessment or both are required.

Step 3 Emissions mitigation assessment. For developments identified as requiring mitigation in step 2, this sets out the approach for calculating the extent of mitigation required.

Step 4: Air quality assessment. Where this is required (following step 2) this is to be based on the approach set out within IAQM planning guidance (Institute of Air Quality Management and Environmental Protection UK, 2017).

Local Policy

- 2.22 The Arun Local Plan 2011-2031 (Arun District Council, 2018) sets out the planning aims and policies for the district. It includes policy QE DM3: Air Pollution, which states:

"All major development proposals will be required to assess the likely impacts of the development on air quality and mitigate any negative impacts by:

- a. *Ensuring the development is located within easy reach of established public transport services;*
- b. *Maximising provision for cycling and pedestrian facilities;*
- c. *Encouraging the use of cleaner transport fuels on site, through the inclusion of electric car charging points; and*
- d. *Contributing towards the improvement of the highway network where the development is predicted to result in increased congestion on the highway network.*

Development proposed nearby any Air Quality Management Area (AQMA) declared within the District within the Plan period, will require an air quality assessment to identify likely impacts of development upon the designated area. Developers will be required to ensure delivery of the actions set out within any Air Quality Action Plan.

Industrial development which is regulated by environmental permits (that creates or results in dust, smell, fumes, smoke, heat, radiation, gases, steam or other forms of pollution) must be located in such a position which ensures that the health, safety and amenity of users of the site or surrounding land is not put at risk and the quality of the environment would not be damaged or put at risk.

Developments shall also be consistent with all other Local Plan policies."

Assessment Guidance

- 2.23 This assessment has been based on a number of guidance documents, the most significant of which are set out below:

Local Air Quality Management Technical Guidance (LAQM.TG(16)) (Defra, 2016)

- 2.24 This document was published for use by local authorities in review and assessment work but includes a number of technical guidelines on carrying out modelling assessment and management of monitoring data which set out best practice and are therefore relevant to all air quality assessments.

Land-Use Planning and Development Control: Planning For Air Quality (Institute of Air Quality Management and Environmental Protection UK, 2017)

- 2.25 Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) have published joint guidance on the assessment of air quality impacts for planning purposes. This includes information on when an air quality assessment is required, what should be included in an assessment and the assessment of significance.

Guidance on the Assessment of Dust from Demolition and Construction
(Institute of Air Quality Management, 2014)

- 2.26 This guidance includes a methodology for identifying the risk magnitude of potential dust sources associated with demolition, construction, earthworks and trackout. This is then used to identify the level of mitigation necessary in order for the impacts to be not significant.

Air quality and emissions mitigation guidance for Sussex (Sussex-air Partnership, 2020)

- 2.27 Sets out the assessment and mitigation requirements for developments within local authorities within Sussex, including Arun.

3.0 METHODOLOGY

- 3.1 The methodology set out in the following sections has been identified as being the most appropriate approach to identifying what potential impacts are associated with the proposed development and whether these impacts are acceptable, along with any required mitigation.
- 3.2 The approach has been to identify baseline conditions (based on mapped backgrounds, existing concentrations as measured by the local authority and the presence of any AQMAs or exceedances of the EU Limit Values), likely conditions for future residents and any potentially significant change in air quality which may result from the proposed development.
- 3.3 The approach for assessing construction dust impacts has been to identify the risk of dust impacts related to construction, followed by the level of mitigation appropriate so that the impact is not significant.

Baseline Air Quality

- 3.4 Information regarding baseline air quality has been obtained by collating the results of monitoring carried out by ADC and referring to maps of AQMAs and exceedances of the EU Limit Values. Background concentrations have been defined based on the national pollution maps published by Defra (Defra, 2020).

Construction Dust Impacts

- 3.5 There is a potential for dust from onsite activities and off-site trackout during the demolition and construction to have an impact on sensitive human receptors within the study area.
- 3.6 The suspension of dust and particulate matter is related to weather conditions and wind direction, ground and particle characteristics and on-site activities. There is a potential for impacts to occur when dust generating activities coincide with dry, windy conditions and where sensitive receptors are located downwind of the dust source.
- 3.7 Separation distance is an important factor as large particles ($>30\text{ }\mu\text{m}$) which are responsible for most dust annoyance largely deposit within 100 m of sources. Intermediate particles ($10\text{--}30\text{ }\mu\text{m}$) can travel 200-500 m but are less likely to trigger annoyance. Significant annoyance is therefore generally limited to a few hundred metres of the source. Small particles ($<10\text{ }\mu\text{m}$) are deposited slowly and may travel up to 1 km. Whilst these particles are responsible for most impacts on human health, impacts are not likely to be experienced at significant distance due to dispersion effects.
- 3.8 The assessment of construction dust impacts has been carried out following the IAQM 'Guidance on the Assessment of Dust from Construction and Demolition' (Institute of Air Quality Management, 2014). Within this guidance, an 'impact' is described as a change in pollutant concentration or dust deposition and an 'effect' is described as the consequence of an impact.
- 3.9 The assessment considered three potential dust impacts:

- Loss of amenity due to dust soiling;
 - Human health effects due to an increase in concentrations of PM₁₀; and
 - Harm caused to ecological receptors due to dust deposition.
- 3.10 Full details of the approach taken to assessing dust are provided in Appendix B, the stages of the assessment are:
- Identify whether there are sensitive receptors within the relevant distances (study area) for site activities during the construction phase;
 - Assess risk of dust impacts for each site activity type (demolition, earthworks, construction and trackout) – this includes identifying the emissions magnitude for each activity type, the sensitivity of the area and then combining these factors to identify risk;
 - Identify mitigation measures, based on assessed risk, sufficient to ensure off-site impacts are not significant;
 - Assess impacts with mitigation in place. These should normally be not significant;
- 3.11 The IAQM guidance makes it clear that no assessment of the significance of impacts without mitigation should be carried out as mitigation measures will be required due to planning conditions as well as best practice for construction companies. The IAQM guidance also states that the residual impact, taking into account the proposed mitigation will usually be 'not significant'.

Sussex-Air Air Quality and Emissions Mitigation Screening Checklist

- 3.12 The requirement for carrying out an Air Quality Assessment and/or Emissions Mitigation Assessment and the approach to this assessment are based on the approach set out within the guidance provided by the Sussex-Air partnership (Sussex-air Partnership, 2020).

Operational Road Traffic Impacts

- 3.13 The IAQM/EPUK guidance 'Land Use Planning and Development Control: Planning for Air Quality' (Institute of Air Quality Management and Environmental Protection UK, 2017) includes a list of indicative criteria for where a detailed air quality assessment would be needed. The criteria relating to screening air quality impacts relating to additional traffic are:
- An increase in LDV traffic of 500 AADT (or 100 AADT within or adjacent to an AQMA); or
 - An increase in HDV traffic of 100 AADT (or 25 AADT within or adjacent to an AQMA).
- 3.14 The above criteria apply to any individual link and therefore, a development generating over 500 AADT (or 100 AADT) may be considered to fall below the

screening criteria where the increase is spread over a number of different road links.

- 3.15 The potential for air quality impacts on proposed sensitive receptors within the development is screened qualitatively, based on the development layout and location in relation to emission sources such as roads as well as baseline air quality.
- 3.16 Where it is not possible to screen out significant impacts from road sources, detailed modelling is then carried out.

Air Quality Impacts Significance Criteria

- 3.17 Where traffic generation falls below the screening criteria on all road links, or there are no relevant receptors on links where the screening criteria are exceeded, the impact of development traffic on air quality is considered to be not significant.
- 3.18** In the absence of official guidance on the assessment of the potential for existing emissions sources to impact the proposed development, this assessment has been limited to identifying whether future air quality within the development will meet the objectives set out in

3.19 Table 2-1.**Emissions Mitigation Assessment**

- 3.20 The emissions mitigation assessment follows the approach set out within the Sussex-Air guidance (Sussex-air Partnership, 2020). This approach utilises the damage cost appraisal toolkit, published by Defra and sets out the inputs to use within the Defra tool. It should be noted that the Sussex-Air guidance includes a link to a previous version of the toolkit, (2019) which has since been withdrawn. The revised toolkit (Defra, 2020) has been used within this assessment.

4.0 BASELINE CONDITIONS

Site Context and Study Area

- 4.1 The site is bound to the north by allotments and gardens belonging to houses, to the east by Ford Road, to the south by Priory Lane and to the west by agricultural land. There are no significant sources of emissions in the area surrounding the development site, aside from emissions from road traffic. Roads in close proximity to the development site are not considered to be busy or congested roads, with Ford Road considered to be the most significant in terms of traffic volume.
- 4.2 The study area in relation to air quality has been defined as:
- For the construction dust risk assessment, the study area is the area up to 350 m from the development site boundary. This is based on the IAQM guidance (Institute of Air Quality Management, 2014).
 - For the operational phase traffic emission assessment, the study area incorporates receptors adjacent to roads expected to exceed the screening criteria set out in paragraph 3.13.
 - For the assessment of site suitability, the study area has been identified as the area within the boundary of the site and sources which will influence this area.

EU Limit Values

- 4.3 The study area does not contain any exceedances of the EU limit values, based on measured or predicted values.

LAQM

- 4.4 ADC has assessed air quality within its area as part of its responsibilities under LAQM. It is concluded that there are no exceedances of the objective within the district and that no AQMA is required.

Monitoring

- 4.5 ADC carried out NO₂ monitoring at 18 diffusion tube monitoring sites in 2019. The closest and most representative locations are identified in **Figure 4-1** and results for the last 5 years are shown in **Table 4-1**. PM₁₀ and PM_{2.5} concentrations are not measured by ADC.

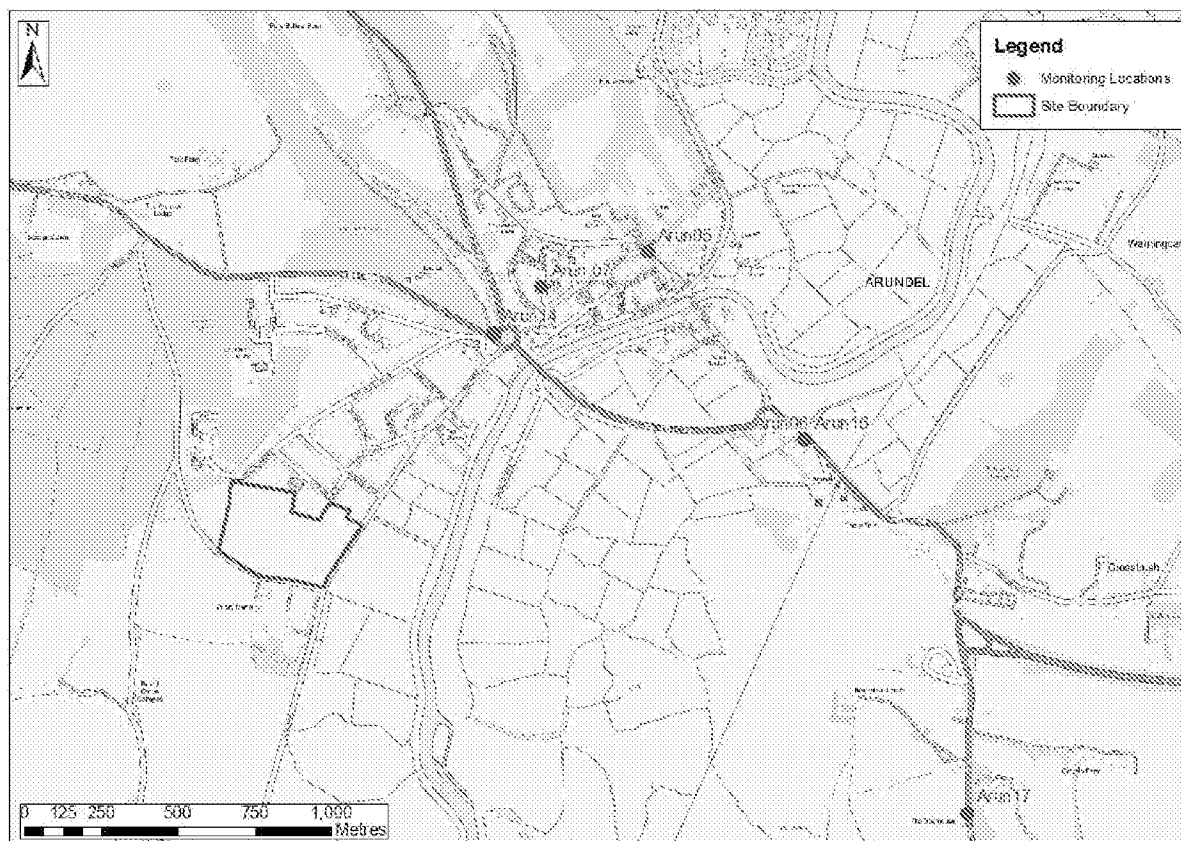


Figure 4-1: Local Monitoring Locations

Table 4-1: Measured Annual Mean NO₂ Concentrations (µg/m³)

Site ID	Site Name	Site Type	2015	2016	2017	2018	2019
5	Arun05	Roadside	17.1	16.2	18	16	13
6	Arun06	Roadside	31.4	27.6	28.6	26	21
7	Arun07	Urban Background	12.7	13.7	-	-	-
8	Ford08	Roadside	17.1	16.6	18.5	18	15
14	Arun14	Roadside	28.2	27.4	29	29	23
16	Arun16	Roadside	18.1	17	17.6	19	13
17	Arun17	Kerbside	-	-	-	35	31
Objective			40				

Exceedances of the Objective highlighted in **BOLD**

2015 – 2019 data taken from (Arun District Council, 2020)

- 4.6 Concentrations of NO₂ at all monitoring sites in the area surrounding the development site have been below the objective over the past four years. Concentrations at all monitoring sites have been below 60 µg/m³, suggesting that the 1-hour objective has been met. There is no clear trend in concentrations over this time.

Predicted Background Concentrations

- 4.7 Predicted background concentrations have been obtained from national maps provided by Defra (Defra, 2020). Background concentrations for the development site are shown in **Table 4-2**.
- 4.8 The predicted background concentrations are all well below the relevant objectives at the development site.

Table 4-2: Predicted Annual Mean Background Concentrations ($\mu\text{g}/\text{m}^3$)

Year	Location	NO ₂	PM ₁₀	PM _{2.5}
2020	500500, 106500	8.1	13.0	8.8
Objectives		40	40	25

5.0 PREDICTED IMPACTS

Screening Assessment

Construction Dust

- 5.1 The primary potential effects during construction relate to annoyance and loss of amenity caused by dust soiling, health impacts relating to PM₁₀ and ecological impacts due to dust deposition. Based on the screening criteria set out by the GLA and IAQM, it is considered necessary to carry out a construction dust risk assessment as there are sensitive human receptors within 350 m of the development site boundary. No demolition is required and no assessment of dust impacts due to demolition has therefore been carried out.
- 5.2 There are no ecological sites within 50 m of the site boundary or roads along which dust may be tracked and therefore the assessment of dust deposition on ecological sites can be scoped out.

Sussex-Air Screening Checklist

- 5.3 Whilst the proposed development is not in or close to an AQMA, the development is considered to be a Major development as it will include more than 10 dwellings. Based on the screening checklist within the Sussex-Air guidance, both an air quality assessment and emissions mitigation assessment are required. The air quality assessment is based on the criteria set out within IAQM guidance.

Operational Road Traffic

- 5.4 The guidance provided by Sussex-Air is that, where an air quality assessment is required, this assessment should follow the guidance provided by the IAQM. The proposed development is expected to generate 460 AADT during the operational phase. In reality the additional traffic will be even lower on individual links as some traffic will travel north on Ford Road, and some south. Traffic generation therefore falls below the EPUK/IAQM screening criteria and the impacts of operational traffic emissions on existing receptors can be considered 'not significant'. A detailed assessment is therefore not required.

Construction Dust Risk Assessment

Dust Emission Magnitude

- 5.5 The dust emission magnitude relating to Earthworks, Construction, and Trackout have been determined based on the IAQM guidance (as set out in **Appendix B**).
- 5.6 Proposed earthworks activities include excavating foundations of the new development. Works could extend up to approximately 98,000 m² (the area of the site). The soil composition is Loamy and Clayey which may suggest an increased potential for emission due to the small particle size in clay soils, however, the soil is generally wet which is therefore likely to lead to a reduced risk of dust emission. The emission magnitude for earthworks has been identified as **Large**, although it

should be noted that in reality, it is unlikely that the entire site will be subject to earthworks.

- 5.7 Construction will incorporate construction of 90 homes which will equate to a building volume of between 25,000 and 100,000 m³ in total. The emission magnitude for construction is considered to be **Medium**.
- 5.8 The number of vehicles exiting the site which may track material onto roads is unknown but, given the size and nature of the site, this is expected to peak at between 10 and 50 HDVs a day. Based on this, the dust emission magnitude is considered to be **Medium**.

Area Sensitivity

- 5.9 The sensitivity of the area to dust soiling and human health impacts has been assessed based on the criteria shown in **Appendix B**.
- 5.10 Residential properties, commercial premises and car parks are considered to be sensitive to dust soiling. There are less than 10 residential dwellings, incorporating car parking within 20 m of the site boundary and between 10 and 100 residential dwellings within 50 m of the site boundary. The sensitivity of the area surrounding the site to dust soiling is considered to be **Medium**.
- 5.11 The guidance states that trackout can occur on roads up to 500 m from large sites. As construction vehicle routing is not currently known, the worst case assumption has been made that all main roads may be used by HDVs exiting the site and that dust and mud may be tracked up to 500 m along these roads from the site entrance. There are between 10 and 100 residential properties within 20 m of roads which may be subject to trackout and the sensitivity to dust soiling relating to trackout is therefore considered to be **High**.
- 5.12 Residential properties, schools, nursing homes and nurseries are considered to be high sensitivity receptors in terms of human health impacts. PM₁₀ concentrations in the area are likely to be similar to the background PM₁₀ concentrations set out within the Defra background maps (shown in **Table 4-2**). For the purposes of the construction dust risk assessment, the assumption has been made that concentrations of PM₁₀ are less than 24 µg/m³. There are less than 10 residential receptors within 20 m of the site boundary and between 10 and 100 residential properties within 50 m of the site boundary. Taking into account the assumed baseline PM₁₀ concentrations and the number of sensitive receptors, the sensitivity of the surrounding area to human health impacts related to PM₁₀ due to earthworks, construction and trackout is considered to be **Low**.
- 5.13 The risk of construction dust impacts, without mitigation, has been assessed based on the tables provided in **Appendix B** and the identified risks are shown in **Table 5-1**.

Table 5-1: Risk of Construction Dust Impacts Without Mitigation

Potential Impact	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium
Human Health	Low	Low	Low

- 5.14 Overall, taking into consideration the risks set out in **Table 5-1**, appropriate mitigation measures corresponding to a 'medium risk' site are required during the construction phase of the development. The recommended list of mitigation measures is set out in **Section 6.0**.
- 5.15 The IAQM recommends that no judgement of the significance of construction dust effects should be made without taking mitigation into account. This is due to the fact that mitigation measures are assumed to be secured by planning conditions and legal requirements as well as construction codes of conduct. Following implementation of the recommended mitigation (as set out in **Section 6.0**), residual impacts will be 'not significant'.

Site Suitability

- 5.16 The development site is located to the west of the nearest significant road (Ford Road) which is not expected to be congested. There are already a number of residences on this road, located between the development and the centre of Arundel. The development plans do not include sensitive residential use within 40 m of Ford Road. At this distance from a significant road source, concentrations are considered to be close to background.
- 5.17 Background concentrations at the development site are well below the relevant objectives.
- 5.18 Highways England have published their preferred route for the A27 Arundel bypass. This route is to the south of the development site, crossing Ford Road between Priory Lane and Tortington. Whilst the precise details of the route are yet to be finalised, the current projected route is in excess of 300 m south of the development site boundary and, as such will not significantly alter air quality for future residents within the development. Whilst it is acknowledged that this bypass is likely to alter traffic patterns in the area and may potentially lead to additional traffic on Ford Road in order to access the A27, given the current concentrations in the area and the distance between the proposed receptors and the roads in question, any change in air quality for residents within the site will be insignificant.
- 5.19 Given the proposed layout and existing conditions in the area, concentrations for future residents are expected to be well below the relevant objectives. Air quality for residents is therefore considered to be good. No additional mitigation of air quality within the site is required. Consideration of the potential route of A27 Arundel bypass has concluded that it is unlikely to alter these conclusions.

6.0 MITIGATION

Construction Dust

- 6.1 The following standard mitigation measures have been identified as being appropriate for a medium risk site. This is based on the recommendations within the IAQM guidance on 'The Assessment of Dust from Demolition and Construction' (Institute of Air Quality Management, 2014).

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

Dust Management

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, realtime PM₁₀ continuous monitoring and/or visual inspections.

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.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- 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.

- Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose 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.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). (Desirable)
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing). (Desirable)

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 and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Earthworks

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

Construction

- Avoid scabbling (roughening of concrete surfaces) if possible. (Desirable)
- 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.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. (Desirable)
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust. (Desirable)

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.

- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Operation

- 6.2 Following the guidance provided by Sussex-Air (Sussex-air Partnership, 2020) and the toolkit published by Defra (Defra, 2020), an emissions mitigation assessment has been carried out. This is based on the earliest potential year of opening (2022) and a five year period thereafter and includes emissions of NO_x and PM_{2.5}. The total recommended cost of emissions mitigation over the five year period, based on the central estimate is **£20,614**.
- 6.3 Whilst the details of any proposed mitigation are yet to be determined, it is expected that this will incorporate EV charging points and measures designed to increase use of sustainable modes of travel.

7.0 CONCLUSIONS

- 7.1 The potential air quality impacts associated with the proposed residential development on Ford Road, Arundel have been assessed.
- 7.2 The development site is not located within or close to an AQMA.
- 7.3 There is the potential for dust and PM₁₀ impacts during the construction phase, however, with the proposed mitigation measures in place, these impacts will be not significant.
- 7.4 The traffic generation associated with the development is below the relevant screening criteria and therefore, the impact of the development on local air quality is considered to be not significant. Nevertheless, an emissions mitigation assessment has been carried out and an appropriate level of mitigation cost identified.
- 7.5 The impact of local air quality on future residents of the development has been considered. It is considered that air quality for future residents will be good without mitigation.
- 7.6 Overall, it is concluded that there are no air quality constraints to the proposed development which is in accordance with local, regional and national policy and guidance.

8.0 REFERENCES

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Appendix A Glossary

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
ACE	Ardent Consulting Engineers
ADC	Arun District Council
ADMS	Air Dispersion Modelling System
AQA	Air Quality Assessment
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
Diffusion Tube (DT)	A passive sampler used for collecting NO ₂ in the air
EA	Environment Agency
EC	European Commission
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes, includes Heavy Goods Vehicles and buses
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LEZ	Low Emission Zone
LGV	Light Goods Vehicle
m ³	Square Metres
NAQO	National Air Quality Objective as set out in Air Quality Strategy and the Air Quality Regulations
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides, generally considered to be nitric oxide and NO ₂ . The main source is from combustion of fossil fuels, including petrol and diesel used in road vehicles and natural gas used in gas-fired boilers.
NPPF	National Planning Policy Framework
NRMM	Non-road mobile machinery
PM ₁₀ or PM _{2.5}	Small airborne particles less than 10/2.5 µg in diameter
PPG	Planning Practice Guidance
Receptor	A location where the effects of pollution may occur
TEA	Triethanolamine

Appendix B IAQM Dust Assessment Approach

B1 Step 1: Screen the need for an assessment

B1.1 Step 1 is the screen the need for an assessment against the following criteria:

- 'Human receptor' within:
 - 350 m (50 m in London) of the boundary of the site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- 'Ecological receptor' within:
 - 50 m of the boundary of the site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

B1.2 Where there are no sensitive receptors within these distances, it can be concluded that the impact is negligible and no further assessment relating to construction dust impacts is required.

B2 Step 2: Assess the risk of dust impacts

B2.1 The risk of dust at sufficient quantum to cause annoyance/health/ecological impacts should be based on:

- The scale and nature of the works (potential dust emission magnitude) (**Table B.1**); and
- The sensitivity of the area to dust impacts based on the matrices shown in **Table B.2**, **Table B.3** and **Table B.4**.

B2.2 These factors are then combined to determine the risk of dust impacts without mitigation applied for each of the four activities (Demolition, Earthworks, Construction and Trackout) following the matrices shown in **Table B.5**, **Table B.6** and **Table B.7**.

Table B.1: Potential Dust Emission Magnitude

Size	Definition
Demolition	
Small	Total building volume <20,000 m ³ , construction material with low potential for dust release (eg metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months.
Medium	Total building volume 20,000 m ³ – 50,000 m ³ , potentially dusty construction material, demolition activities 10-20 m above ground level.

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

Table B.2: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	<10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low

Low	>1	Low	Low	Low	Low
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Table B.3: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<350
High	>32 µg/m ³ ^a	>100	High	High	High	Low
		10-100	High	High	Medium	Low
		<10	High	Medium	Low	Low
	28-32 µg/m ³ ^b	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		<10	High	Medium	Low	Low
	24-28 µg/m ³ ^c	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		<10	Medium	Low	Low	Low
	<24 µg/m ³ ^d	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		<10	Low	Low	Low	Low
Medium	>32 µg/m ³ ^a	>100	High	Medium	Low	Low
		10-100	Medium	Low	Low	Low
		<10	Medium	Low	Low	Low
	28-32 µg/m ³ ^b	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		<10	Low	Low	Low	Low
	24-28 µg/m ³ ^c	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		<10	Low	Low	Low	Low
	<24 µg/m ³ ^d	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		<10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

^a >18µg/m³ in Scotland^b 16-18 µg/m³ in Scotland^c 14-16 µg/m³ in Scotland^d <14 µg/m³ in Scotland**Table B.4: Sensitivity of the Area to Ecological Impacts**

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

Table B.5: Risk of Impacts – Demolition

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

Table B.6: Risk of Impacts – Earthworks and Construction

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

Table B.7: Risk of Impacts – Trackout

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

B3 Step 3: Site-specific Mitigation

B3.1 Based on the outcome of Step 2, appropriate mitigation measures are recommended. The guidance includes a list of mitigation measures for Low, Medium and High Risk sites but final recommendations should be based on professional judgement and take into account particular site sensitivities and differences in risk for different activities or areas of the site. The mitigation recommended in the guidance are shown in **Table B.8**.

Table B.8: Mitigation Measures**(H = Highly Recommended, D = Desirable and N = Not Recommended)**

Mitigation Measure	Low Risk	Medium Risk	High Risk
Communications			
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	N	H	H

2. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H	H	H
3. Display the head or regional office contact information	H	H	H
Dust Management			
4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, realtime PM ₁₀ continuous monitoring and/or visual inspections.	D	H	H
Site Management			
5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H	H	H
6. Make the complaints log available to the local authority when asked.	H	H	H
7. 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.	H	H	H
8. Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	N	N	H
Monitoring			
9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.	D	D	H
10. 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	H	H	H
11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H	H	H

12. Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	N	H	H
Preparing and maintaining the site			
13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H	H	H
14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H	H	H
15. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period	D	H	H
16. Avoid site runoff of water or mud.	H	H	H
17. Keep site fencing, barriers and scaffolding clean using wet methods.	D	H	H
18. 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.	D	H	H
19. Cover, seed or fence stockpiles to prevent wind whipping.	D	H	H
Operating vehicle/machinery and sustainable travel			
20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable	H	H	H
21. Ensure all vehicles switch off engines when stationary - no idling vehicles.	H	H	H
22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H	H	H
23. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)	D	D	H
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N	H	H
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	N	D	H
Operations			
26. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water	H	H	H

sprays or local extraction, e.g. suitable local exhaust ventilation systems.			
27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H	H	H
28. Use enclosed chutes and conveyors and covered skips.	H	H	H
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H	H	H
30. 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.	D	H	H
Waste Management			
31. Avoid bonfires and burning of waste materials.	H	H	H
Demolition			
32. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	D	D	H
33. 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.	H	H	H
34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H	H	H
35. Bag and remove any biological debris or damp down such material before demolition.	H	H	H
Earthworks			
36. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	N	D	H
37. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable	N	D	H
38. Only remove the cover in small areas during work and not all at once.	N	D	H
Construction			
39. Avoid scabbling (roughening of concrete surfaces) if possible	D	D	H
40. 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.	D	H	H
41. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable	N	D	H

emission control systems to prevent escape of material and overfilling during delivery.			
42. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	N	D	D
Trackout			
43. 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.	D	H	H
44. Avoid dry sweeping of large areas.	D	H	H
45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D	H	H
46. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	N	H	H
47. Record all inspections of haul routes and any subsequent action in a site log book.	D	H	H
48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	N	H	H
49. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D	H	H
50. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	N	H	H
51. Access gates to be located at least 10 m from receptors where possible.	N	H	H

B4 Step 4: Determine Significant Effects

- B4.1 Recommended mitigation measures should be sufficient to ensure that the impact is normally 'not significant'. There may at times be limitations to appropriate mitigation measures (such as lack of water) and therefore, an assessment should always be made based on the characteristic of each site and the surrounding area.

B5 Step 5: Dust Assessment Report

- B5.1 The dust assessment report should include enough detail to ensure that the basis for the determination of emission magnitude and sensitivity of the area, and therefore the site risk, are clear. The required mitigation so also be set out within the report, along with a description of the mechanism that will ensure that the appropriate level of mitigation will be implemented (such as through a planning condition).