

Report

Land East of Horndean Southern Expansion

Chapter 7 Air Quality Appendices

For White Peak Planning

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7.1 Professional Experience

Penny Wilson, BSc (Hons) CSci MEnvSc MIAQM

- 7.1.1 Ms Wilson is a Technical Director with AQC, with more than 20 years' relevant experience in the field of air quality. She has been responsible for numerous assessments for a range of infrastructure developments including power stations, road schemes, ports, airports and residential/commercial developments. The assessments have covered operational and construction impacts, including dust and odour nuisance. She also provides services to local authorities in support of their LAQM duties, including the preparation of Review and Assessment and Action Plan reports, as well as audits of Air Quality Assessments submitted with planning and DCO applications. She has provided expert evidence to a number of Public Inquiries and civil court, and is a Member of the Institute of Air Quality Management and a Chartered Scientist.

Julia Burnell, MEnvSci (Hons) MEnvSc MIAQM

- 7.1.2 Miss Burnell is a Principal Consultant with AQC with over nine years' experience in the field of air quality. She has experience of undertaking a range of air quality assessments for power, transportation, and mixed-use development projects both in the UK and internationally. She is also experienced at undertaking the air quality and greenhouse gas assessments for Environmental Impact Assessments and preparing the respective air quality and climate change chapters for the Environmental Statement. Prior to her work with AQC, Julia completed an MEnvSci (Hons) in Environmental Science (four-year integrated master's). She is a Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.

Faye Wilder, BSc (Hons) MSc

- 7.1.3 Miss Wilder is an Assistant Consultant with AQC and joined the company in 2023. During her BSc Geography degree at the University of Birmingham, she developed an interest in air quality, which continued into her MSc in Environmental Management at the University of Reading. Her master's thesis investigated personal air pollution exposure across microenvironments using wearable air pollution sensors, and how this varied from fixed air pollution monitoring stations.

Dr Imogen Heard, BSc (Hons) MSc PhD

- 7.1.4 Dr Heard is an Associate of AQC with over 12 years' experience in the field of air quality. She has been involved in numerous development projects including road schemes, energy from waste facilities, urban extensions and energy centres. These have included the use of ADMS-5 and ADMS-Roads dispersion models to study the impacts of a variety of pollutants, including nitrogen dioxide, PM₁₀ and PM_{2.5}, and the preparation of air quality assessment reports and air quality chapters for Environmental Statements. She also has experience in undertaking construction dust risk assessments, Air Quality Neutral assessments and human health risk assessments, as well as in preparing local authority reports. Prior to joining AQC she worked as a scientist in the Atmospheric Dispersion and Air Quality area at the UK Met Office for four years, modelling the dispersion of a range of pollutants over varying spatial and temporal scales.

7.2 Legislative and Planning Policy Context

7.2.1 All European legislation referred to in this report is written into UK law and remains in place.

Air Quality Strategy 2007

7.2.2 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 Air Quality Management Area (AQMA) and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Air Quality Strategy 2023

7.2.3 The Air Quality Strategy: Framework for Local Authority Delivery 2023 (Defra, 2023a) sets out the strategic air quality framework for local authorities and other Air Quality Partners in England. It sets out their powers and responsibilities, and actions the government expects them to take. It does not replace other air quality guidance documents relevant to local authorities.

Clean Air Strategy 2019

7.2.4 The Clean Air Strategy (Defra, 2019) 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

7.2.5 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. It 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 also 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.

7.2.6 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's 'Zero Emission Vehicle' (ZEV) mandate requires that 80% of new cars and 70% of new vans sold in Great Britain must be zero emission by 2030, increasing to 100% by 2035. 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.

Environment Act 2021

- 7.2.7 The UK's new legal framework for protection of the natural environment, the Environment Act (2021) passed into UK law in November 2021. The Act gives the Government the power to set long-term, legally binding environmental targets. It also establishes an Office for Environmental Protection (OEP), responsible for holding the Government to account and ensuring compliance with these targets.
- 7.2.8 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (SI 2023 No. 96) sets two new targets for future concentrations of PM_{2.5}. These targets are described in Section 7.3 in **ES Volume 1: Chapter 7 – Air Quality**.

Environmental Improvement Plan 2025

- 7.2.9 Defra published its 25 Year Environment Plan in 2018 (Defra, 2018a). The Environment Act (2021) requires Defra to review this Plan at least every five years. The Environmental Improvement Plan 2025 (Defra, 2023b) is the second revision. This outlines the progress made since 2018 and adds detail to the goals defined in the 2018 Plan and subsequent Environmental Improvement Plan 2023, including that of achieving clean air.
- 7.2.10 The Environmental Improvement Plan 2025 sets out the new air quality targets which have been set for concentrations of PM_{2.5}. These targets, which are described in more detail in **ES Volume 1: Chapter 7 – Air Quality**, include the long-term targets in the Statutory Instrument described in Paragraph 7.2.8, and interim targets to be achieved by 2030.
- 7.2.11 The 2025 Plan reiterates the role of local authorities in helping it meet both its targets and existing commitments. It also reiterates the respective roles of industry, agricultural sectors, and the DfT in providing the coordinated action required to meet both its new, and pre-existing targets and commitments.

Planning Policy

National Policies

- 7.2.12 The National Planning Policy Framework (NPPF) (2024) 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 (Paragraph 8c) is an environmental objective:

"to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".

- 7.2.13 To prevent unacceptable risks from air pollution, Paragraph 187 of 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 and water quality, taking into account relevant information such as river basin management plans".

- 7.2.14 Paragraph 198 states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health,

living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".

7.2.15 More specifically on air quality, Paragraph 199 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".

7.2.16 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019), 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".

7.2.17 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".

7.2.18 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"*.

7.2.19 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".

7.2.20 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".

7.2.21 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 Policies

- 7.2.22 The Havant Borough Council (HBC) Core Strategy (Havant Borough Council, 2011) was adopted in March 2011. The Strategy sets out the planning framework for the borough until 2026. The Strategy includes one policy relevant to air quality, Policy 'DM10 Pollution', which states:

"Development that may cause pollution of water, air... and other pollutants will only be permitted where all of the following relevant criteria can be met:

... 2. National air quality standards or objectives would not be breached..."

- 7.2.23 HBC submitted the Havant Borough Local Plan for examination in February 2021, to replace the adopted Core Strategy, however this was withdrawn in March 2022. Work has since started on a new Local Plan for HBC, the 'Building a Better Future Draft Local Plan 2025' document, which underwent consultation in 2025. Within the Draft Local Plan, there is one policy (Policy 44) which is of relevance to air quality, however, as this is only a draft policy and has not been formally adopted, it has not been considered further.

Building Standards

- 7.2.24 Part F(1) of Schedule 1 of the Building Regulations 2010 as amended June 2022 (Ministry of Housing, Communities & Local Government, 2022) places a duty on building owners, or those responsible for relevant building work¹, to ensure adequate ventilation is provided to building occupants.
- 7.2.25 Approved Document F (HM Government, 2021a), which accompanies the Building Regulations, explains that care should be taken to minimise entry of external air pollutants. Specific steps should be taken to manage ventilation intakes where the building is near to a significant source of emissions, or if local ambient concentrations exceed values set in the Air Quality Standards Regulations 2010 (see Section 7.3 in **ES Volume 1: Chapter 7 – Air Quality**). These steps include maximising the distance between emission source and air intake, considering likely dispersion patterns, and considering the timing of pollution releases when designing the ventilation system.
- 7.2.26 Part S(1) of Schedule 1, and Regulation 44D, of the Building Regulations 2010 (Ministry of Housing, Communities & Local Government, 2022) define a requirement for the provision of infrastructure for charging electric vehicles. Precise requirements are explained further within Approved Document S (HM Government, 2021b) and depend on the overall number of parking spaces provided and the average financial cost of installation.
- 7.2.27 Compliance with the Building Regulations is not required for planning approval, but it is assumed that the Regulations will be complied with in the completed development.

Air Quality Action Plans

National Air Quality Plan

- 7.2.28 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, 2018b) was published in October 2018 and sets

¹ Building work is a legal term for work covered by the Building Regulations. With limited exemptions, the Regulations apply to all significant building work, including erecting or extending a building.

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 Clean Air Zone (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 limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

- 7.2.29 HBC has not declared any AQMAs and, therefore, have not prepared an Air Quality Action Plan (AQAP).

7.3 Construction Dust Assessment Procedure and Impact Assessment

7.3.1 The criteria developed by IAQM (2024) divide the activities on construction sites into four types to reflect their different potential impacts. These are:

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

7.3.2 The assessment procedure includes the four steps summarised below:

STEP 1: Screen the Need for a Detailed Assessment

7.3.3 An assessment is required where there is a human receptor within 250 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 250 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 250 m from the site entrance(s).

7.3.4 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

7.3.5 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).

7.3.6 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

7.3.7 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 A7.3.1.

Table A7.3.1: Examples of How the Dust Emission Magnitude Class May be Defined

Class	Examples
Demolition	

Class	Examples
Large	Total building volume >75,000 m ³ , potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >12 m above ground level
Medium	Total building volume 12,000 m ³ – 75,000 m ³ , potentially dusty construction material, demolition activities 6-12 m above ground level
Small	Total building volume <12,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >110,000 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 >6 m in height.
Medium	Total site area 18,000 m ² – 110,000 m ² , moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3 m – 6 m in height.
Small	Total site area <18,000 m ² , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height.
Construction	
Large	Total building volume >75,000 m ³ , on site concrete batching; sandblasting
Medium	Total building volume 12,000 m ³ – 75,000 m ³ , potentially dusty construction material (e.g. concrete), on site concrete batching
Small	Total building volume <12,000 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	20-50 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	<20 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

7.3.8 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 PM₁₀, the local background concentration; and
- site-specific factors, such as whether there are natural shelters to reduce the risk of wind-blown dust.

- 7.3.9 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 A7.3.2. These receptor sensitivities are then used in the matrices set out in Table A7.3.3, Table A7.3.4 and Table A7.3.5 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

- 7.3.10 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 A7.3.6 as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

- 7.3.11 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 7.6.

STEP 4: Determine Significant Effects

- 7.3.12 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'.
- 7.3.13 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 A7.3.2: 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 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 horticulture), footpaths, short term car parks and roads
Sensitivities of People to the Health Effects of PM₁₀		
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	Sites of Special Scientific Interest with dust sensitive features

Class	Principles	Examples
	locations with a national designation where the features may be affected by dust deposition	
Low	locations with a local designation where the features may be affected by dust deposition	Local Nature Reserves with dust sensitive features

Table A7.3.3: Sensitivity of the Area to Dust Soiling Effects on People and Property²

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A7.3.4: Sensitivity of the Area to Human Health Effects²

Receptor Sensitivity	Annual Mean PM ₁₀	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32 µg/m ³	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m ³	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m ³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m ³	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m ³	>10	High	Medium	Low	Low

² 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 250 m, 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.

Receptor Sensitivity	Annual Mean PM ₁₀	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
	28-32 µg/m ³	1-10	Medium	Low	Low	Low
		>10	Medium	Low	Low	Low
	24-28 µg/m ³	1-10	Low	Low	Low	Low
		>10	Low	Low	Low	Low
	<24 µg/m ³	1-10	Low	Low	Low	Low
		>10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table A7.3.5: Sensitivity of the Area to Ecological Effects²

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

Table A7.3.6: 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			

Sensitivity of the 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

Construction Phase Impact Assessment

- 7.3.14 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 sections above), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

Demolition

- 7.3.15 There will be a requirement to demolish four brick buildings with an approximate total volume of under 12,500 m³. The method of demolition has not yet been decided. Based on the example definitions set out in Table A7.3.1 in Appendix 7.2, the dust emission class for demolition is considered to be *small*.

Earthworks

- 7.3.16 The characteristics of the soil at the site have been defined using the British Geological Survey's UK Soil Observatory website (British Geological Survey, 2025), as set out in Table A7.3.7. Overall, it is considered that, when dry, this soil has the potential to be moderately dusty.

Table A7.3.7: Summary of Soil Characteristics

Category	Record
Soil Layer Thickness	Deep
Soil Parent Material Grain Size	Mixed (Argillic - Argillaceous ^a – Arenaceous ^b – Rudaceous ^c)
European Soil Bureau Description	Mixed (Colluvium – Prequaternary Marine/Estuarine Sand and Silt – River Loam)
Soil Group	Mixed (Light to Medium to Heavy)
Soil Texture	Mixed (Sand to Sandy Loam ^d - Clayey Loam to Sandy Loam – Clayey Loam to Silty Loam)

^a Grain size < 0.06 mm.

^b Grain size 0.06 – 2.0 mm.

^c Grain size > 2.0 mm.

^d A loam is composed mostly of sand and silt.

- 7.3.17 The site covers an area of approximately 1,060,000 m² and most of this will be subject to earthworks, involving excavation, haulage, tipping, stockpiling and landscaping. Dust will arise mainly 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 A7.3.1, the dust emission class for earthworks is considered to be *large*.

Construction

- 7.3.18 The proposed development involves the construction of up to 1,800 residential properties, with a total building volume of more than 75,000 m³. The construction period will be phased over a ten year period. Dust will arise from vehicles travelling over unpaved ground and the handling and storage of dusty materials. Based on the example definitions set out in Table A7.3.1, the dust emission class for construction is considered to be *large*.

Trackout

- 7.3.19 The number of heavy vehicles accessing the site, which may track out dust and dirt, is currently unknown, but given the size of the site it is likely that there will be a maximum of 20 outward heavy vehicle movements per day. Based on the example definitions set out in Table A7.3.1, the dust emission class for trackout is considered to be *medium*.
- 7.3.20 Table A7.3.8 summarises the dust emission magnitude for the proposed development.

Table A7.3.8: Summary of Dust Emission Magnitude

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

Sensitivity of the Area

- 7.3.21 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 PM₁₀ concentrations.
- 7.3.22 The IAQM guidance explains that residential properties are 'high' sensitivity receptors to dust soiling (see Table A7.3.2). Residential properties are also classified as being of 'high' sensitivity to human health effects. However, it is also anticipated that some dwellings within the site itself will be occupied prior to the full completion of the construction phase. At this stage, the phases of construction and occupation is unknown, however as a worst-case, it is assumed that there could be more than 100 residential properties occupied onsite within 20m of the construction works (see Figure A7.3.1).



Figure A7.3.1: 20 m Distance Bands around the Site Boundary

Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025.

- 7.3.23 The IAQM guidance (IAQM, 2024) explains that there is a risk of material being tracked 250 m from the site exit. Access during construction is likely to be taken from the proposed permanent access points off Eastleigh Road and Southleigh Road. The anticipated construction traffic route has not been confirmed; therefore, all potential routes have been considered. There are approximately 15 existing residential dwellings within 20 m of the roads used by the construction vehicles along which material could be tracked (see Figure A7.3.2).



Figure A7.3.2: 20 m Distance Bands around Roads Used by Construction Traffic within 250 m of the Site Exits

Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025.

Sensitivity of the Area to Effects from Dust Soiling

- 7.3.24 Using the information set out in Paragraph 7.3.22 and Figure A7.3.1 alongside the matrix set out in Table A7.3.3, the area surrounding the onsite works is of 'high' sensitivity to dust soiling. Using the information set out in Paragraph 7.3.23 and Figure A7.3.2 alongside the same matrix, the area is also of 'high' sensitivity to dust soiling due to trackout. The details of the phasing of the construction works are not currently known. If there are completed properties on site while construction works are still ongoing, the sensitivity of the area to onsite works and trackout may change.

Sensitivity of the Area to any Human Health Effects

- 7.3.25 The matrix in Table A7.3.4 requires information on the baseline annual mean PM₁₀ concentration in the area. It is considered that the modelled 2023 baseline PM₁₀ concentration at Receptor 'E19' (presented in Table 7.8 in **ES Volume 1: Chapter 7 – Air Quality**) best represents conditions near to the site, this being 12.1 µg/m³.
- 7.3.26 Using the information set out in Paragraphs 7.3.22 and Figure A7.3.1 alongside the matrix in Table A7.3.4, the area surrounding the onsite works is of 'low' sensitivity to human health effects. Using the information set out in Paragraph 7.3.23 and Figure A7.3.2 alongside the same matrix, the area surrounding roads along which material may be tracked from the site is also of 'low' sensitivity.

Sensitivity of the Area to Ecological Effects

- 7.3.27 The guidance only considers designated ecological sites within 50 m to have the potential to be impacted by the construction works. There are no designated ecological sites within 50 m of the site boundary or those roads along which material may be tracked, thus ecological impacts will not be considered further.

Summary of the Area Sensitivity

- 7.3.28 Table A7.3.9 summarises the sensitivity of the area around the proposed construction works.

Table A7.3.9: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	High Sensitivity	High Sensitivity
Human Health	Medium Sensitivity	Low Sensitivity
Ecological	None	None

Risk and Significance

- 7.3.29 The dust emission magnitudes in Table A7.3.8 have been combined with the sensitivities of the area in Table A7.3.9 using the matrix in Table A7.3.6, 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 A7.3.10. These risk categories have been used to determine the appropriate level of mitigation (Step 3 of the assessment procedure).

Table A7.3.10: Summary of Risks of Impacts Without Mitigation

Source	Dust Soiling	Human Health
Demolition	Medium Risk	Low Risk
Earthworks	High Risk	Medium Risk
Construction	High Risk	Medium Risk
Trackout	Medium Risk	Low Risk

7.4 EPUK & IAQM Planning for Air Quality Guidance

- 7.4.1 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

- 7.4.2 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”.

- 7.4.3 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 m² of commercial floorspace;
- are carried out on land of 1 ha or more.

- 7.4.4 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 m² 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 mgNO_x/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 mgNO_x/Nm³;
 - Compression ignition engine: 400 mgNO_x/Nm³;
 - Gas turbine: 50 mgNO_x/Nm³.
- 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 mgNO_x/Nm³ and 25 mgPM/Nm³.

7.4.5 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".

7.4.6 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

7.4.7 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 m² of floor space for all other uses or a site area greater than 1 ha.

7.4.8 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.

7.4.9 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.

7.4.10 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.

7.4.11 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 NO_x 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 NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm³.

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".

7.4.12 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".

7.4.13 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".

7.4.14 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

- 7.4.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:
- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
 - a judgement on the overall significance of the effects of any impacts.
- 7.4.16 The guidance recommends 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 and, 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.
- 7.4.17 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. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.
- 7.4.18 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 7.1.

7.5 Modelling Methodology

Model Inputs

- 7.5.1 Predictions have been carried out using the ADMS-Roads dispersion model (v5). The model requires the user to provide various input data, including emissions from each section of road and the road characteristics (including road width). Vehicle emissions have been calculated based on vehicle flow, composition and speed data using the EFT (Version 13.1) published by Defra (2025). Model input parameters are summarised in Table A7.5.1 and, where considered necessary, discussed further below.

Table A7.5.1: Summary of Model Inputs

Model Parameter	Value Used
Terrain Effects Modelled?	No
Variable Surface Roughness File Used?	Yes – 12km x 12km Cartesian grid at 50m resolution
Urban Canopy Flow Used?	No
Advanced Street Canyons Modelled?	No
Noise Barriers Modelled?	No
Meteorological Monitoring Site	Thorney Island
Meteorological Data Year	2023
Dispersion Site Surface Roughness Length (m)	N/A (variable surface roughness file used)
Dispersion Site Minimum MO Length (m)	30
Met Site Surface Roughness Length (m)	0.2
Met Site Minimum MO Length (m)	1
Gradients?	No

- 7.5.2 AADT flows and the proportions of HDVs, have been provided by Stantec, who have undertaken the transport assessment work for the proposed development. Traffic speeds for the Automatic Traffic Counts (ATC) locations have been determined using speeds provided by Stantec, and, for the non-ATC road links, 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 A7.5.2. Diurnal and monthly flow profiles for the traffic have been derived from the national profiles published by DfT (2024).

Table A7.5.2: Summary of Traffic Data used in the Assessment

Road Link	2023		2029 (Without Scheme)		2029 (With Scheme)	
	AADT	%HDV	AADT	%HDV	AADT	%HDV
ATC1 – Southleigh Road	7,655	5.6	8,582	5.5	11,215	4.2
ATC2 – Bartons Road	11,271	5.9	13,072	5.6	17,178	4.3

Road Link	2023		2029 (Without Scheme)		2029 (With Scheme)	
	AADT	%HDV	AADT	%HDV	AADT	%HDV
ATC3 – Park Road, North	26,053	6.7	29,202	6.6	31,292	6.1
ATC4 – Southleigh Road	4,121	6.0	4,643	5.9	7,243	3.8
ATC5 – Horndean Road	7,714	11.4	9,199	10.5	10,430	9.2
ATC6 – A259 Havant Road	21,292	7.6	23,987	7.4	24,485	7.3
A27 West of Site	72,779	4.3	83,474	4.2	85,407	4.1
A27 WB - Off-Slip	3,589	3.9	4,005	3.8	4,171	3.7
A259 (N)	21,028	5.3	23,287	5.2	24,396	5.0
A27 WB - On-Slip	13,522	0.0	15,113	0.0	16,245	0.0
Church Lane	431	6.5	474	6.5	474	6.5
A259 - Havant Road	21,292	7.6	23,987	7.4	24,485	7.3
Emsworth Road	16,360	2.3	18,142	2.3	20,047	2.1
A27 EB - Off-Slip	13,933	3.8	15,486	3.8	16,287	3.6
A27 EB - On-Slip	981	0.7	1,262	0.6	1,566	0.5
Southleigh Road	7,655	5.6	8,582	5.5	11,215	4.2
Emsworth Road - W	11,658	2.0	12,803	2.0	13,531	1.9
Pook Lane	953	2.9	1,047	2.9	1,047	2.9
Emsworth Road - E	14,503	2.2	16,103	2.2	18,007	2.0
Comley Hill	8,829	2.2	10,079	2.1	11,320	1.9
Bartons Road	12,370	2.5	14,292	2.4	14,695	2.3
Horndean Road	11,329	1.7	13,434	1.5	14,302	1.5
Emsworth Common Road	8,496	3.6	9,356	3.6	9,385	3.6
Bartons Road - W	10,762	3.6	12,475	3.4	16,045	2.6
New Lane	7,403	2.8	8,130	2.8	8,666	2.6
Bartons Road – E	11,271	5.9	13,072	5.6	17,178	4.3
Horndean Road - N	11,303	1.7	13,407	1.5	14,274	1.5
Southleigh Road - W	4,121	6.0	4,643	5.9	7,243	3.8
Horndean Road - S	7,714	11.4	9,199	10.5	10,430	9.2
Southleigh Road - E	7,243	2.0	9,551	1.6	10,053	1.6
Horndean Road - N	7,714	11.4	9,199	10.5	10,430	9.2

Road Link	2023		2029 (Without Scheme)		2029 (With Scheme)	
	AADT	%HDV	AADT	%HDV	AADT	%HDV
B2148	11,360	1.8	12,476	1.8	13,707	1.7
New Brighton Road	5,875	2.1	6,452	2.1	6,452	2.1
North Street	14,370	2.2	16,671	2.1	17,902	2.0
A259 - W	21,292	7.6	23,987	7.4	24,485	7.3
High Street	4,414	4.0	4,848	4.0	4,848	4.0
A259 - E	20,096	3.7	22,264	3.6	22,564	3.6
Eastleigh Road	4,806	1.4	5,375	1.4	8,510	0.9
Southleigh Road - W	7,655	5.6	8,582	5.5	11,215	4.2
Southleigh Road - E	4,121	6.0	4,643	5.9	7,243	3.8
Bartons Road - E	12,307	2.6	14,223	2.4	14,626	2.4
Bartons Road - W	11,271	5.9	13,072	5.6	17,178	4.3
Eastleigh Road	4,781	1.4	5,348	1.4	8,484	0.9
Petersfield Road - N	10,932	2.3	12,071	2.3	12,071	2.3
Petersfield Road - S	17,649	2.1	19,973	2.1	23,543	1.8
Bartons Road	12,885	2.7	14,806	2.6	18,376	2.1

7.5.3 Figure A7.5.1 shows the road network included within the model, along with the speed at which each link was modelled.

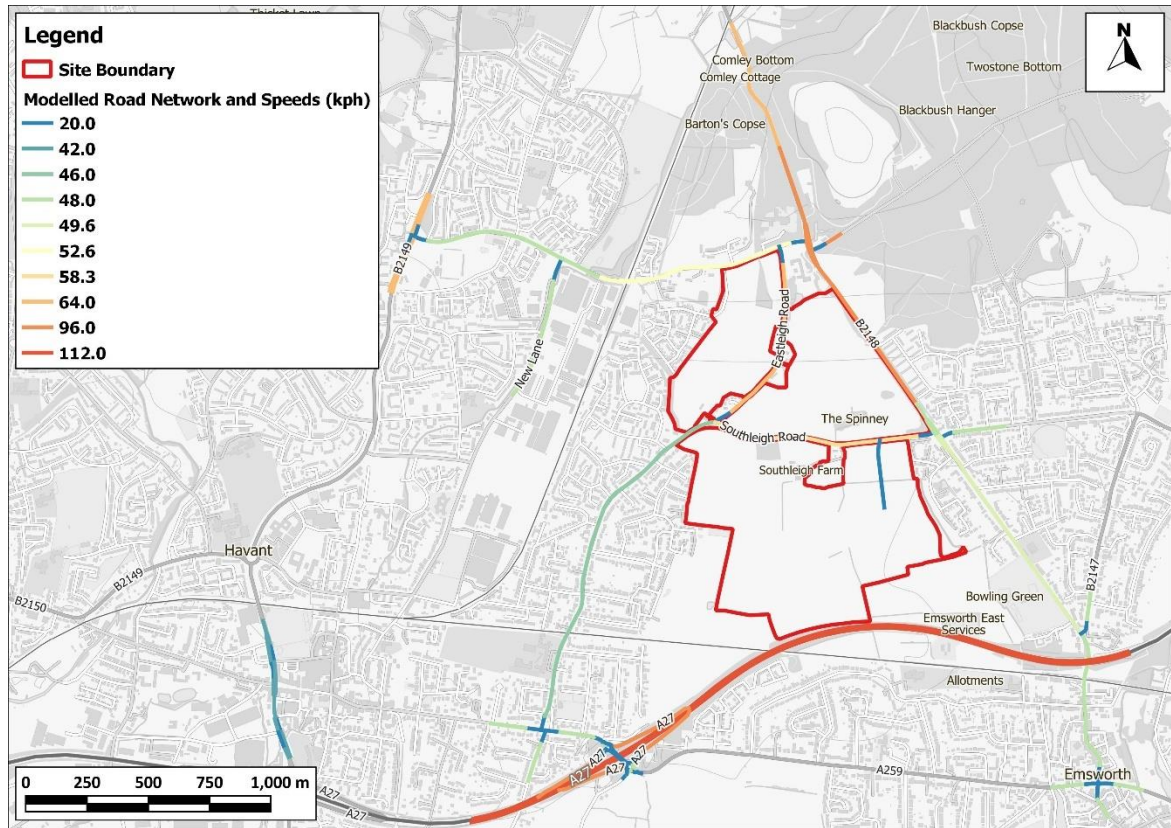


Figure A7.5.1: Modelled Road Network & Speed

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

7.5.4

Hourly sequential meteorological data in sectors of 10 degrees from Thorney Island for 2023 have been used in the model. The Thorney Island meteorological monitoring station is located approximately 4.8 km to the south of the proposed development. Both the application site and the Thorney Island meteorological station are located at near-coastal locations on the south coast of England. The topography of the model domain is similar to that around the meteorological monitoring station and measurements from this station are considered to provide the most robust basis to predict meteorology within the model domain. A wind rose for the site for the year 2023 is provided in Figure A7.5.2. Raw data were provided by the Met Office and processed by AQC for use in ADMS.

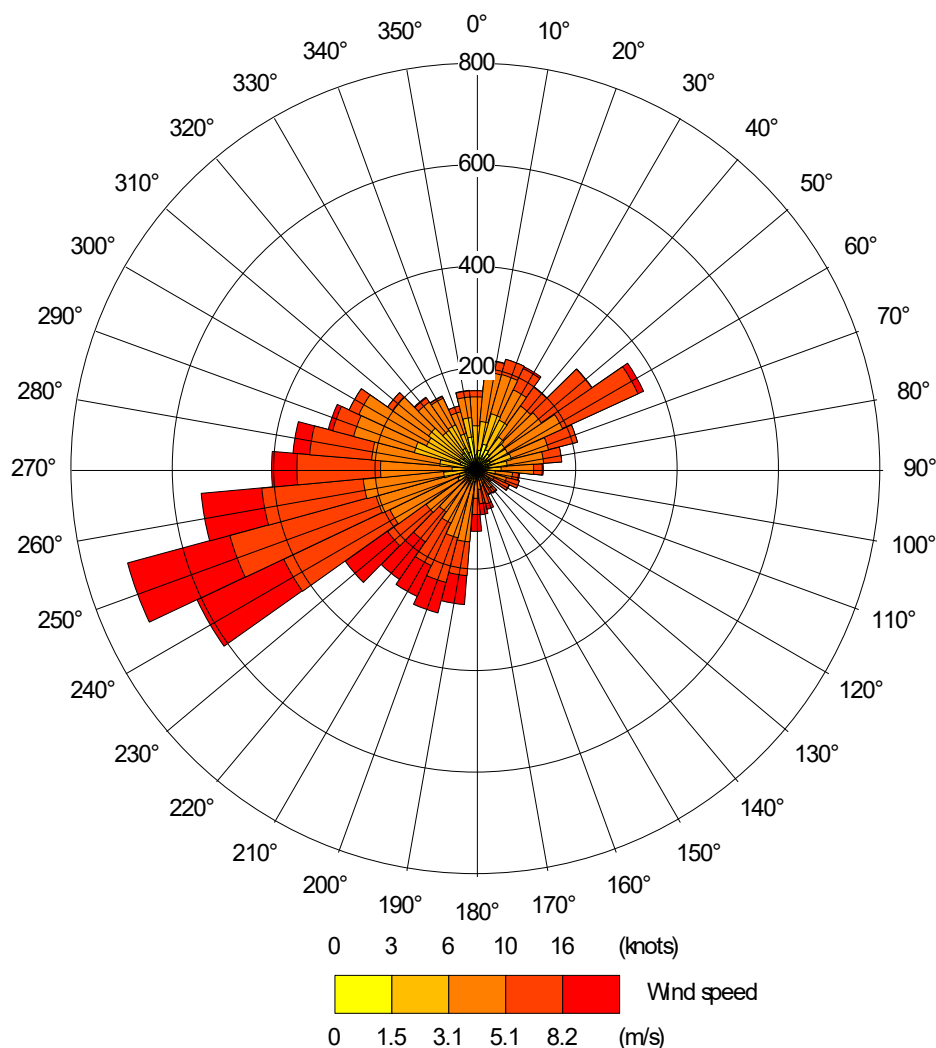


Figure A7.5.2: Wind Rose

Model Verification

7.5.5 Evidence collected over many years has shown that, in most urban areas, dispersion modelling relying upon Defra's EFT has tended to systematically under-predict roadside nitrogen dioxide concentrations. To account for this, it is necessary to adjust the model against local measurements. The model has been run to predict annual mean nitrogen dioxide concentrations during 2023 at diffusion tube monitoring sites '4', '22', '28', and '31'. These sites have been selected because of their roadside location within the study area and the availability of traffic data for the roads along which they are located.

Nitrogen Dioxide

7.5.6 Most nitrogen dioxide (NO₂) 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 (NO_x = NO + NO₂).

7.5.7 The model output of road-NO_x (i.e. the component of total NO_x coming from road traffic) has been compared with the 'measured' road-NO_x. Measured road-NO_x has been calculated from the

measured NO₂ concentrations and the predicted background NO₂ concentration using the NO_x from NO₂ calculator (Version 9.1) available on the Defra LAQM Support website (Defra, 2025).

- 7.5.8 The unadjusted model has under predicted the road-NO_x contribution at all monitoring sites except monitoring site '4'; model underpredictions are a common experience with this and most other road traffic emissions dispersion models. In the model, monitoring sites '22' and '28' were being under predicted to a greater extent than at monitoring site '31'. Two separate adjustment factors have therefore been determined as the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution for these two groups of monitoring sites, forced through zero (Figure A7.5.3 and Figure A7.5.5). By calculating two separate adjustment factors, the model performance is improved as it is able to better account for the localised dispersion characteristics.
- 7.5.9 A calculated adjustment factor of 4.049 (based on monitoring sites '22' and '28') has only been applied to the modelled road NO_x concentrations for receptors E12 and E21 as these receptors are located adjacent to the same road (Park Road South) as monitoring sites '22' and '28' so will experience similar dispersion characteristics. A second calculated adjustment factor of 1.548, based on measured concentrations at sites '4' and '31' has been applied to the modelled road-NO_x concentrations at the remaining receptors.
- 7.5.10 The total nitrogen dioxide concentrations have then been determined by combining the adjusted modelled road-NO_x concentrations with the predicted background NO₂ concentration within the NO_x to NO₂ calculator. Figure A7.5.4 and Figure A7.5.6 compares final adjusted modelled total NO₂ at each of the monitoring sites to measured total NO₂, and shows a close agreement.

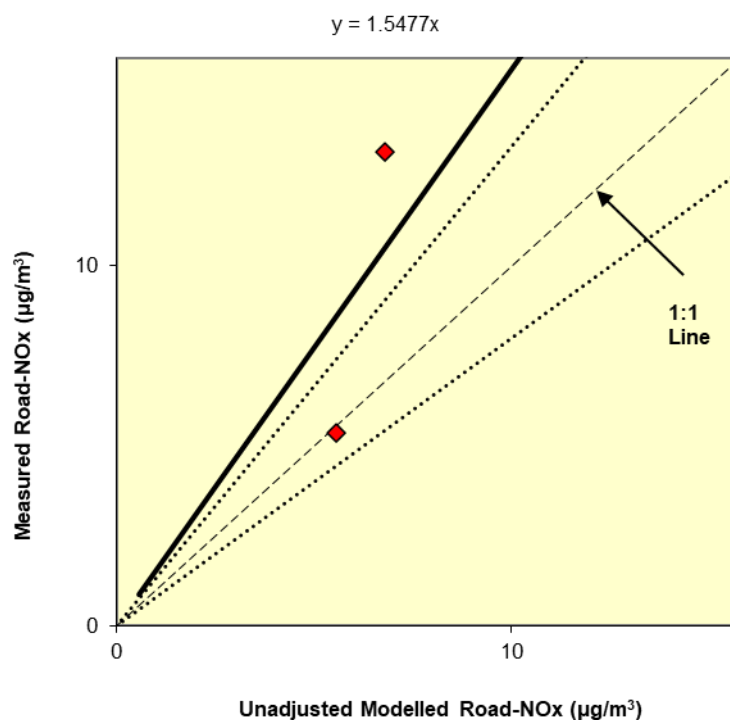


Figure A7.5.3: Comparison of Measured Road NO_x to Unadjusted Modelled Road NO_x Concentrations for diffusion tubes '4' and '31'. The dashed lines show $\pm 25\%$.

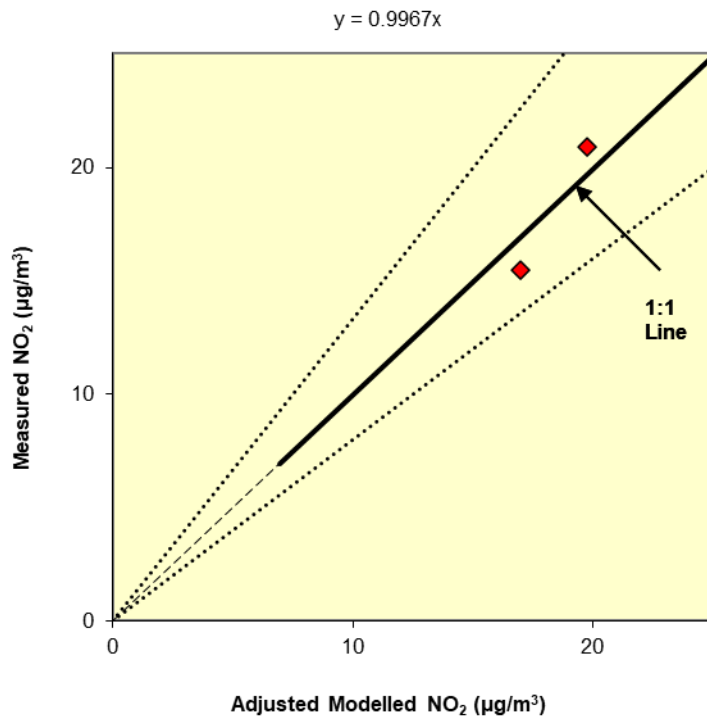


Figure A7.5.4: Comparison of Measured Total NO_2 to Final Adjusted Modelled Total NO_2 Concentrations for diffusion tubes '4' and '31'. The dashed lines show $\pm 25\%$.

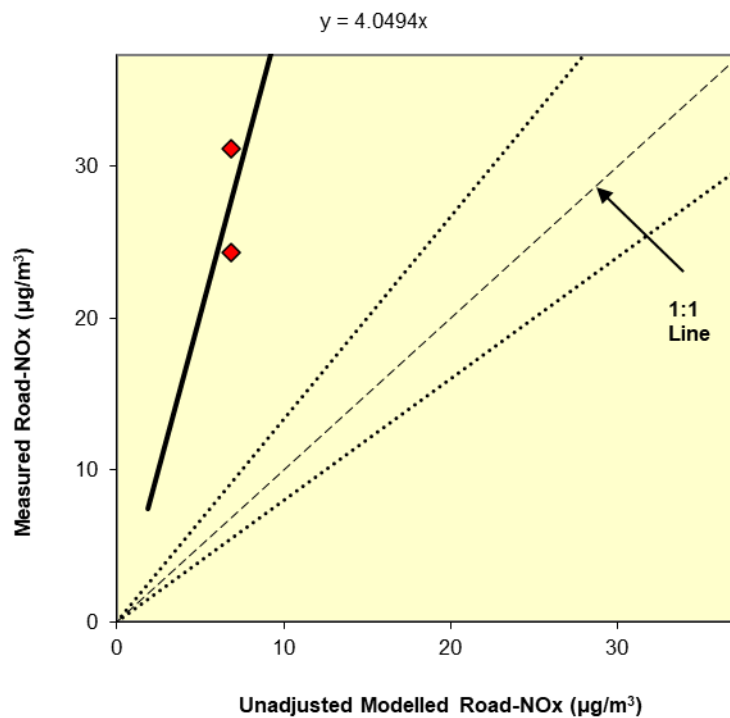


Figure A7.5.5: Comparison of Measured Road NO_x to Unadjusted Modelled Road NO_x Concentrations for diffusion tubes '22' and '28'. The dashed lines show $\pm 25\%$.

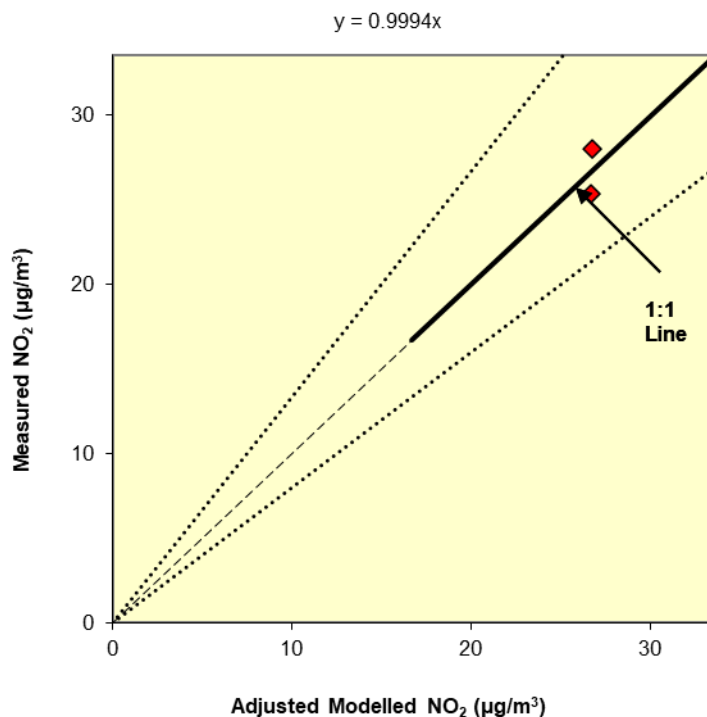


Figure A7.5.6: Comparison of Measured Total NO₂ to Final Adjusted Modelled Total NO₂ Concentrations for diffusion tubes '22' and '28'. The dashed lines show $\pm 25\%$.

PM₁₀ and PM_{2.5}

- 7.5.11 The approach described above for NO_x and nitrogen dioxide determines the road increment of concentrations by subtracting the predicted local background from the roadside measurements. This works well for NO_x because the differences between roadside and background concentrations typically represent a large proportion of the total measured value. The same is not true for PM₁₀ and PM_{2.5} concentrations, which are dominated by non-road emissions, even at the roadside. In practice, the influence of a local road on concentrations can often be smaller than the uncertainty in the mapped background concentration. As an example of this, 31% of all roadside and kerbside sites in London which measured PM_{2.5} in 2019 with >75% data capture, recorded an annual mean concentration lower than the equivalent Defra mapped background value. Using measured background concentrations does not provide any significant benefit, owing largely to the spatial resolution of available measurements, but also because of measurement uncertainty. For example, hourly-mean PM_{2.5} concentrations measured at roadside sites are often lower than those measured at nearby urban background sites, while concentrations at urban background sites are often lower than those measured at rural sites.
- 7.5.12 For these reasons, it is not appropriate to calculate the annual mean road-increment to PM₁₀ and PM_{2.5} concentrations by subtracting either the mapped background or a local measured background concentration. This, in turn, means that the approach to model adjustment which is described for NO_x and NO₂ is not appropriate for PM₁₀ and PM_{2.5}. Historically, many studies have derived a model adjustment factor for NO_x and applied this to PM₁₀ and PM_{2.5}. This is also not appropriate, since there is no reason to expect the same bias in emissions of NO_x, PM₁₀ and PM_{2.5}.
- 7.5.13 While there is very strong evidence that EFT-based models have consistently under-predicted road-NO_x concentrations in urban areas, there is no equivalent evidence for PM₁₀ and PM_{2.5}. There is

currently no strong basis for applying any adjustment to the model outputs. Predicted concentrations of PM₁₀ and PM_{2.5} have thus not been adjusted.

Post-processing

- 7.5.14 The model predicts road-NO_x concentrations at each receptor location. These concentrations have been adjusted using the adjustment factor set out above, which, along with the background NO₂, has been processed through the NO_x to NO₂ calculator available on the Defra LAQM Support website (Defra, 2025). 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 NO₂ based on the adjusted road-NO_x and the background NO₂.

7.6 Construction Mitigation

7.6.1 Table A7.6.1 sets out a list of best-practice measures from the IAQM guidance (IAQM, 2024) 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.

Table A7.6.1: Best-Practice Mitigation Measures Recommended for the Works

Measure	Desirable	Highly Recommended
Communications		
Develop and implement a stakeholder communications plan that includes community engagement before and during work 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 environmental manager/engineer or the site manager		✓
Display the head or regional office contact information		✓
Dust Management Plan		
Develop and implement a Dust Management Plan (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		✓
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		✓
Hold regular liaison meetings with other high risk construction sites within 250 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		✓
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		✓

Measure	Desirable	Highly Recommended
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		✓
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 PM ₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction (IAQM, 2018)		✓
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		✓
Cover, seed, 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		✓
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable		✓

Measure	Desirable	Highly Recommended
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced 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)		✓
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials		✓
Implement a Travel Plan that supports and encourages sustainable staff travel (public transport, cycling, walking, and car-sharing)		✓
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		✓
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		✓

Measure	Desirable	Highly Recommended
Bag and remove any biological debris or damp down such material before demolition		✓
Measures Specific to Earthworks		
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable		✓
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable		✓
Only remove the cover from small areas during work, not all at once		✓
Measures Specific to Construction		
Avoid scabbling (roughening of concrete surfaces), if possible		✓
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, 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		✓
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust	✓	
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		✓
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;		✓

Measure	Desirable	Highly Recommended
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);		✓
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and		✓
Access gates should be located at least 10 m from receptors, where possible		✓

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