

Appendix 9.3: Construction Dust

Dust Risk Assessment Methodology

The following section outlines criteria developed by the IAQM for the assessment of air quality impacts arising from construction and demolition activities⁵. The assessment procedure is divided into four steps and is summarised below:

Step 1: Screen the Need for a Detailed Assessment

An assessment will normally be required where there are human receptors within 350 m of the Site boundary and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance(s). There are no ecological designations within 50m of the site boundary or 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s) which require assessment.

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is 'negligible' and any effects will not be significant.

Step 2: Assess the Risk of Dust Impacts

In step two, the Site is allocated to a risk category on the basis of the scale and nature of the works (Step 2A) and the sensitivity of the area to dust impacts (Step 2B). These two factors are combined in Step 2C to determine the risk of dust impacts before the implementation of mitigation measures. The assigned risk categories may be different for each of the construction activities outlined by the IAQM (construction, demolition, earthworks and trackout). The Site can be divided into zones, for example on a large site where there are differing distances to the nearest receptors.

Step 2A: Define the Potential Dust Emission Magnitude

Dust emission magnitude is based on the scale of the anticipated works and is classified as Small, Medium or Large. The IAQM guidance recommends that the dust emission magnitude is determined separately for demolition, earthworks, construction and trackout. **Table A.9.3.1** describes the potential dust emission class criteria for each outlined activity.

Table A.9.3.1: Criteria Used in the Determination of Dust Emission Magnitude

Activity	Criteria used to Determine Dust Emission Magnitude		
	Small	Medium	Large
Demolition	Total building volume <12,000 m ³ , construction materials with low potential for dust release, demolition activities <6 m above ground.	Total building volume 12,000 m ³ – 75,000 m ³ , potential dusty construction material, demolition activities 6-12 m above ground level.	Total building volume >50,000 m ³ , potentially dusty construction material, demolition activities >12 m above ground level.
Earthworks	Total site area <18,000 m ² , soil type with large grain.	Total site area 18,000 – 110,000 m ² , moderately dusty soil type.	Total site area >110,000 m ² , potentially dusty soil type.
Construction	Total building volume <12,000 m ³ .	Total building volume 12,000 – 75,000 m ³ .	Total building volume >75,000 m ³ .
Trackout	<20 outward HDV trips in any one day. Unpaved road length <50 m.	20-50 outward HDV trips in any one day. Unpaved road length 50-100 m.	>50 outward HDV trips in any one day. Unpaved road length >100 m.

Step 2B: Define the Sensitivity of the Area

The sensitivity of the area takes into account the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of receptors;
- the local background PM₁₀ concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of windblown dust.

The criteria detailed in **Table A.9.3.2** is used to determine the sensitivity of the receptor in relation to dust soiling, health effects and ecological effects.

Table A.9.3.2: Criteria for Determining Sensitivity of Receptors

Sensitivity of Receptor	Criteria for Determining Sensitivity		
	Dust Soiling Effects	Health Effects of PM ₁₀	Ecological Sites
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes	International or national designation and the features may be affected by dust soiling
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM ₁₀	Presence of an important plant species where dust sensitivity is uncertain or locations with a national designation with features that may be affected by dust deposition
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets	Local designation where features may be affected by dust deposition

Table A.9.3.3 and **Table A.9.3.4** are then used to define the sensitivity of the area to dust soiling and human health effects. This should be derived for each of construction, demolition, earthworks and trackout.

Table A.9.3.3: Sensitivity of the Area to Dust Soiling Effects on People and Property

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

*distances considered are to the dust source

Table A.9.3.4: Sensitivity of the Area to Human Health Impacts

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

The sensitivity of the area is then summarised.

Step 2C Define the Risks of Impacts

The dust emission magnitude from **Table A.9.3.1** and sensitivity of the area and receptors from **Table A.9.3.2**, **Table A.9.3.3** and **Table A.9.3.4** are combined, and the risk of impacts from each activity (demolition, earthworks, construction and trackout) before mitigation is applied, is determined using the criteria detailed in **Table A.9.3.5** to **Table A.9.3.8**.

Table A.9.3.5: Risk of Dust Impacts - Demolition

Potential Impact Sensitivity of the 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 A.9.3.6: Risk of Dust Impacts- Earthworks

Potential Impact 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

Table A.9.3.7: Risk of Dust Impacts- Construction

Potential Impact 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

Table A.9.3.8: Risk of Dust Impacts- Trackout

Potential Impact Sensitivity of the 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

Step 3 Determine Site Specific Mitigation

Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the Site is a low, medium or high risk site.

Step 4 Determine Significance of Residual Effects

At step four the significance of residual effects is assessed. For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

There may be cases where, for example, there is inadequate access to water for dust suppression to be effective, and even with other mitigation measures in place there may be a significant effect. Therefore, it is important to consider the specific characteristics of the Site and the surrounding area to ensure that a conclusion of no significant effect is robust.

Construction Dust Impact Assessment

Step 1 – The Need for a Detailed Assessment

The Site boundary is within 350 m of human receptors. In addition, there are human receptors within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance. Therefore, a detailed assessment of the construction phase of the Proposed Scheme was undertaken.

There are no ecological designations within 50m of the Site boundary or 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the Site entrance which require assessment.

Step 2 – Assess the Risk of Dust Impacts

Step 2A Dust Emission Magnitude

The potential dust emission magnitude in relation to the Proposed Scheme has been determined using the criteria detailed in **Table A.x.3.1**. The scale and nature of works onsite were considered to determine the potential dust emission magnitude for demolition, earthwork, construction and trackout activities. Information to determine the classification has been estimated from the Site plans, Google Earth and information provided by the Applicant and the transport consultant. The dust emission magnitude is outlined in **Table A.9.3.9**.

Table A.9.3.9: Dust Emission Magnitudes for Each Activity

Activity	Dust Emission Magnitudes	Justification for Sensitivity Classification
Demolition	Small	there is an area of hardstanding which potentially will need to be removed. Total building volume to be demolished is <12,000 m³
Earthworks	Large	the Site area is > 110,000 m²
Construction	Large	total building volume to be constructed is >75,000 m³
Trackout	Medium	there are likely to be 20 - 50 HDV outward movements in any one day

Step 2B Sensitivity of the Receptors to Dust Soiling and Health Effects

There is long term residential use near the Site. Construction traffic is also expected to pass St Michael's Primary School. In accordance with the criteria in **Table A.9.3.2** and the IAQM guidance, the sensitivity of human receptors is high.

Step 2B Sensitivity of the Area to Dust Soiling and Human Health Effects of PM₁₀

The sensitivity of the area for dust soiling and human health effects has been determined using the criteria detailed in **Table A.9.3.3** and **Table A.9.3.4** respectively.

Access during the enabling and construction stage will be from the south west to Norden Road via Bury and Rochdale Old Road, thereby avoiding any routing of traffic through the residential areas of Bamford and Norden itself.

The sensitivity of the area to dust soiling and human health for each activity is summarised in **Table A.9.3.10**.

Table A.9.3.10: Outcome of Defining the Sensitivity of the Area

Potential Impact	Activity	Sensitivity of the Surrounding Area	Justification for Sensitivity Classification
Dust Soiling	Demolition	Low	There are 1 - 10 highly sensitive receptors between 20 m – 50 m of the Site boundary.
	Earthworks	High	There are 10 - 100 highly sensitive receptors within 20 m of the Site boundary.
	Construction	High	There are 10 - 100 highly sensitive receptors within 20 m of construction activity.
	Trackout	High	There are over 100 highly sensitive receptors within 20 m of the trackout.
Human Health	Demolition	Low	There are 1 - 10 highly sensitive receptors between 20 m – 50 m of the Site boundary. Background pollutant concentrations are below 24 µg/m ³ .
	Earthworks	Low	There are 10 - 100 highly sensitive receptors within 20 m of the Site boundary. Background pollutant concentrations are below 24 µg/m ³ .
	Construction	Low	There are 10 - 100 highly sensitive receptors within 20 m of construction activity. Background pollutant concentrations are below 24 µg/m ³ .
	Trackout	Medium	There are over 100 highly sensitive receptors within 20 m of the trackout road. Background pollutant concentrations are below 24 µg/m ³ .

Step 2C Risk of Impacts

The dust emission magnitude and sensitivity of the area were combined, and the risk of impacts determined using the criteria detailed in **Table A.9.3.5** to **Table A.9.3.8**.

A summary of the risks, before mitigation measures are applied, for dust soiling and human health are shown in **Table A.9.3.11**.

Table A.9.3.11: Risk of Dust Impacts

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

Step 3 – Site-Specific Mitigation

Step 3 of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to the site risk for each activity. Good practice mitigation measures highly recommended for the Proposed Scheme taken from the IAQM guidance are detailed below.

The general mitigation measures (for site management, preparing and maintaining the Site, operating vehicle/machinery, operations and waste management), are appropriate for a site with a ‘high risk’ classification (in this instance the Site is classified as “high” risk due to earthworks and construction)¹. Mitigation measures specific to earthworks, construction and trackout are proposed based on the risk classifications in **Table A.9.3.11**. There are no specific mitigation measures related to demolition as the risk is negligible.

Recommended mitigation measures are shown in **Table A.9.3.12 – Table A.9.3.15**.

Step 4 – Determine Significant Effects

The characteristics of the Site and the surrounding area suggest that mitigation would not be impracticable or ineffective. With the implementation of the recommended mitigation measures, the residual impacts from the construction are considered to be not significant when considered following IAQM guidance⁶.

Dust Assessment Mitigation

Table A.9.3.12 – Table A.9.3.15 outline mitigation for dust associated with construction activities; within the tables, xx = Highly Recommended and x = Desirable.

Table A.9.3.12: Measures relevant for demolition, earthworks, construction and trackout

Mitigation Measure	High Risk
Communications	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on Site.	xx

¹ For those mitigation measures that are general, the highest risk category should be applied. For example, if the site is medium risk for earthworks and construction, but a high risk for demolition and track-out, the general measures applicable to a high risk site should be applied.

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.	xx
Display the head or regional office contact information.	xx
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 PM ₁₀ continuous monitoring and/or visual inspections.	xx
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.	xx
Make the complaints log available to the local authority when asked.	xx
Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.	xx
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.	xx
Monitoring	
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 the Site boundary, with cleaning to be provided if necessary.	xx
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.	xx
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.	xx

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 the 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.	xx
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.	xx
Erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles onsite.	xx
Fully enclose the Site or specific operations where there is a high potential for dust production and the Site is active for an extensive period.	xx
Avoid site runoff of water or mud.	xx
Keep site fencing, barriers and scaffolding clean using wet methods.	xx
Remove materials that have a potential to produce dust from the Site as soon as possible, unless being re-used on-site. If they are being re-used on-site cover as described below.	xx
Cover, seed or fence stockpiles to prevent wind whipping.	xx
Operating vehicle/machinery and sustainable travel	
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.	xx
Ensure all vehicles switch off engines when stationary - no idling vehicles.	xx
Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	xx
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).	xx
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	xx
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	xx
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.	xx
Ensure an adequate water supply on the Site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	xx
Use enclosed chutes and conveyors and covered skips.	xx
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	xx
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.	xx
Waste management	
Avoid bonfires and burning of waste materials.	xx

Table A.9.3.13: Measures specific to earthworks

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

Table A.9.3.14: Measures specific to construction

Mitigation Measure	High Risk
Avoid scabbling (roughening of concrete surfaces) if possible.	xx
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.	xx
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.	xx
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	x

Table A.9.3.15: Measures specific to trackout

Mitigation Measure	Medium Risk
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.	xx
Avoid dry sweeping of large areas.	xx
Ensure vehicles entering and leaving Site are covered to prevent escape of materials during transport.	xx
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable	xx
Record all inspections of haul routes and any subsequent action in a Site log book.	xx
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	xx
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the Site where reasonably practicable).	xx
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.	xx
Access gates to be located at least 10 m from receptors where possible.	xx