Morgan Sindall Construction & Infrastructure Ltd.

Dust Risk Assessment & Dust Management Plan

Central Somers Town, Hampden Cl, London.

Project Number: 445096-01 (00)

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RSK GENERAL NOTES

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Client: Morgan Sindall Construction & Infrastructure Ltd.

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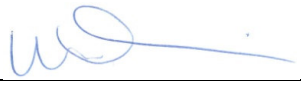
Author	Niranjchan Ramanathan Graduate Air Quality Consultant	**Technical reviewer**	William Franklin Associate Director
Signature		Signature	
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1 INTRODUCTION

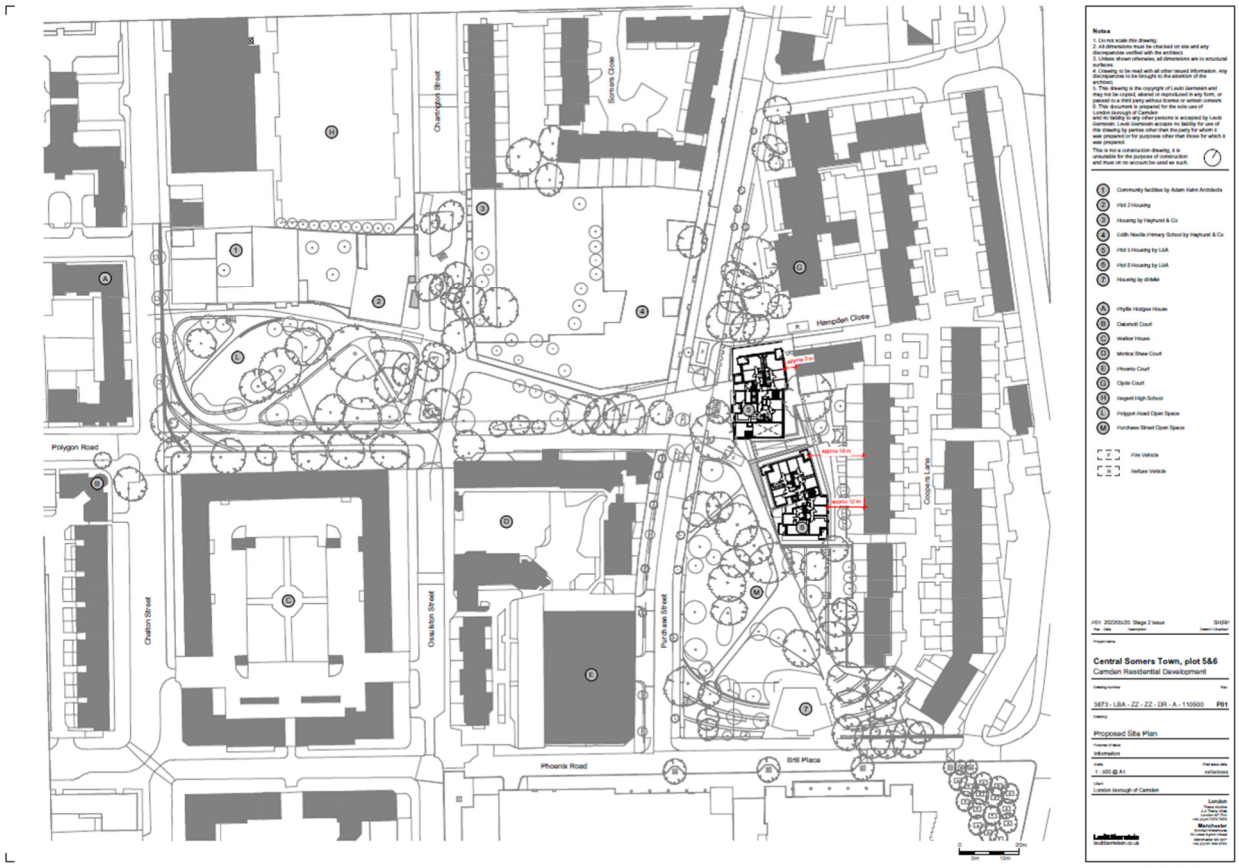
1.1 Background

RSK Environment Limited (RSK) was commissioned by Morgan Sindall Construction & Infrastructure Ltd to prepare a Dust Risk Assessment for the construction of a residential development on two adjacent plots (Plots 5 & Plots 6), at Hampden Close, London NW1 1HW.

The approximate grid reference of the development site is 529806,183202. A site location plan is presented in Figure 1.1. The application site is falls within the jurisdiction of London Borough of Camden, LBC has declared their whole boroughs as Air Quality Management Areas (AQMA), for exceedances of the annual mean nitrogen dioxide (NO_2) objective and the 24-hour mean Particulate Matter (PM_{10}) objective. Therefore, the proposed site is located within an AQMA.

The aim of this Dust Risk Assessment is to provide an evidential basis for the specification of appropriate mitigation measures to ensure that best practice is used to control potential impacts of the site activities on local air quality and amenity.

Figure 1.1: Site Location



2 KEY LEGISLATION AND RELEVANT GUIDANCE

2.1 Ambient Air Quality Standards referenced in assessment

The ambient air quality objectives (AQOs) and air quality standards (AQSs) in the United Kingdom are derived from European Commission (EC) Directives and are adopted into English law via the Air Quality (England) Regulations 2000 and Air Quality (England) Amendment Regulations 2002. The Air Quality Limit Values Regulations 2003 and subsequent amendments implement the Air Quality Framework Directive into English Law. Directive 2008/50/EC was translated into UK law in 2010 via the Air Quality Standards Regulations 2010.

The relevant[1] AQSs to England and Wales to protect human health are summarised in Table 2.1.

Table 2.1: Air Quality Standards Relevant to the Proposed Development

Substance	Averaging period	Exceedances allowed per year	Ground level concentration limit (µg/m^3)
Nitrogen dioxide (NO_2)	1 calendar year	-	40
	1 hour	18	200
Fine particles (PM_{10})	1 calendar year	-	40
	24 hours	35	50
Fine particles ($PM_{2.5}$)	1 year	-	25

2.2 The Environmental Protection Act 1990

The Environmental Protection Act 1990 may be used to regulate 'statutory nuisance', including dust and other specified 'nuisances' related to air quality. Section 3 empowers local authorities to issue an Abatement Notice where a nuisance *"unreasonably and substantially interfere[s] with the use or enjoyment of a home or other premises"* or where it could *"injure health or be likely to injure health."*

2.3 Relevant Guidance

2.3.1 Mayor of London Guidance

The Greater London Authority and Mayor of London supplementary planning guidance *'The Control of Dust and Emissions from Construction and Demolition'* (2014), suggests

[1] Relevance, in this case, is defined by the scope of the assessment.

an approach to the assessment and control of air quality impacts from construction activities.

2.3.2 Guidance on the assessment of dust from demolition and construction (Institute of Air Quality Management, construction dust) ('the IAQM construction dust construction dust guidance')

The Institute of Air Quality Management (IAQM) published a guidance document in construction dust with minor updated in 2016 (herein 'the IAQM construction dust guidance') on the assessment of demolition and construction phase impacts. In order to assess the potential impacts, construction activities are divided into four types:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM_{10} impacts on public exposure (i.e. human health) and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified. Further details of this guidance are provided in Appendix A and the guidance has been used for the assessment of dust impacts and to identify appropriate mitigation measures.

2.3.3 IAQM Guidance of Air Quality Monitoring in the Vicinity of Demolition and Construction Sites ('the IAQM 2018 guidance')

The IAQM published revised guidance in 2018 (Bull et al. 2018) on air quality monitoring in the vicinity of demolition and construction sites which provides high level advise on monitoring but is not designed to be prescriptive with regards the various monitoring techniques that can be used.

3 BASELINE AIR QUALITY CHARACTERISATION

Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources.

A desk-based study was undertaken including a review of monitoring data available from LBC and estimated background data from the Local Air Quality Management (LAQM) Support website operated by the Department for Environment, Food and Rural Affairs (Defra).

3.1 Emissions Sources and Key Air Pollutants

The focus of this assessment is the construction work in relation to the development, for which emissions of dust, PM_{10} and $PM_{2.5}$ are likely to be the primary concern, and to a lesser extent NO_2 which will also be emitted by plant and site traffic during this phase.

3.2 Baseline Monitoring Data

According to the LBC's 2021 Air Quality Annual Status Report, there were four automatic monitoring stations and a network of 33 diffusion tube monitoring locations in 2020. There were five diffusion tubes within 1km of the proposed development site. The annual average NO_2 concentrations from these are reproduced in Table 3.1 below.

The data from these tubes show that there were some exceedances of the annual mean NO_2 air quality objective during 2016-2020, however in the main these were at Roadside locations, with lower concentrations at urban background locations more similar to the site.

Table 3.1: Annual Mean Measured NO_2 Concentrations within 1 km of the Proposed Development Site

Site ID	Location	Site type	Approximate Distance from Site (km)	Annual Mean Concentration (µg/m³)				
				2016	2017	2018	2019	2020
CA6	St. George's Gardens (prev. 'Wakefield Gardens')	Urban background	1.0	31.31	34.83	26.67	24.65	-
CA28	St. George's Gardens East	Urban background	1.0	-	-	-	27.67	21.93

CA10	Tavistock Gardens	Urban background	0.9	39.68	**46.18**	35.35	33.13	26.15
CA20A	Brill Place	Roadside	0.1	-	-	-	**43.13**	**42.85**
CA29	Endsleigh Gardens	Roadside	0.7	-	-	-	**48.34**	34.48

3.3 LAQM Background Data

Estimated background air quality data available from the LAQM-Tools website, may also be used to establish likely background air quality conditions at the development site.

This website provides estimated annual average background concentrations of NO_2, PM_{10} and $PM_{2.5}$ on a 1km^2 grid basis. Table 3.2 reproduces estimated annual average background concentrations for the grid square containing the development site for years from 2022, 2023 and 2024 the year of completion. No exceedances of the NO_2, PM_{10} or $PM_{2.5}$ AQOs are predicted.

Table 3 Estimated Background Annual Average NO_2, PM_{10} and $PM_{2.5}$ Concentrations at Proposed Development Site

Assessment Year	Estimated Annual Average Pollutant Concentrations Derived from the LAQM Website (µg/m^3)		
	Annual Average NO_2	Annual Average PM_{10}	Annual Average $PM_{2.5}$
2022	28.9	18.9	12.1
2023	28.2	18.7	11.9
2024	27.5	18.4	11.8
Air Quality Objective	**40**	**40**	**25**

Note: Presented concentrations for 1 km^2 grid centred on 529500, 183500; approximate centre of development site is 529806,183202

4 CONSTRUCTION PHASE IMPACT ASSESSMENT

This assessment has considered both the potential for dust and PM to be generated whilst construction related activities are undertaken, and the potential for construction-related vehicles at and around the site to affect air quality.

4.1 Construction Dust and Particulate Matter

4.1.1 Methodology

In accordance with the Mayor/GLA and IAQM construction dust guidance, the risk of dust and emissions affecting sensitive receptors in the area around the proposed development site was assessed, based on the 'area sensitivity' and the likely magnitude of emissions from each of the following types of construction activity:

- Demolition;
- Earthworks;
- Construction; and
- Trackout[2]

For each activity, the risk of site-derived dust and emissions affecting local sensitive receptors is determined as either negligible, low, medium or high risk. The risk category may different for each of the activities and depends on the potential emissions magnitude and the sensitivity of the area. Three different types of impact are considered:

- Disamenity due to dust deposition and/or soiling;
- An increase in exposure to PM_{10} with the potential to affect human health; and
- Harm to ecological receptors.

The assessment is used to define the appropriate level of mitigation required. Appendix A sets out the construction dust assessment methodology in further detail.

4.1.2 Potential Dust Emission Magnitude

With reference to the GLA and IAQM criteria outlined in Appendix A, the dust emission magnitudes for earthworks, construction and trackout activities are summarised in Table 4.1, based on information provided by the client.

[2] Within the IAQM construction dust guidance, trackout is defined as "The transport of dust and dirt from the construction/ demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site."

Table 4.1: Summary of Dust Emission Magnitudes (Before Mitigation)

Activity	IAQM Criteria	Dust Emission Magnitude
Demolition	Total building volume is less than <20,000 m^3	**Small**
Earthworks	- Total area where earthworks will take place is estimated by the client to be <2,500m^2 - Clay - The number of heavy earthmoving vehicles is estimated to be 2 during peak of earthworks - Height of stockpiled materials is predicted to be 4m	**Small**
Construction	- 25,000-100,000m^3 - No on-site concrete batching and sandblasting proposed - Potential dusty construction materials on-site	**Medium**
Trackout	- The maximum number of heavy-duty vehicle (HDV) outward a movement in any one day is anticipated to be more than 10 - Clay.	**Medium**

4.1.3 Dust Sensitivity of the Receptors

The IAQM construction dust guidance indicates that the 'area sensitivity' can be determined based on the following factors:

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

Dust sensitive receptors were identified in the vicinity of the proposed development site following the guidance published by IAQM. The sensitivity of the area to dust soiling, human health and ecological impacts is summarised in Table 4.2.

The Defra MAGIC Maps website indicates that there are no Sites of Special Scientific Interest, Special Areas of Conservation, Special Protection Areas, Ramsar sites, National

Nature Reserves or Local Nature Reserves within 50m of the site boundary or potential trackout routes. Impacts of ecological receptors are therefore not considered applicable and have not been considered further.

As trackout dust emission magnitude has been determined as Medium, a 50m trackout route has been considered with traffic being routed onto Town Road.

Figure 4.1 and 4.2 show maps indicating the earthworks/construction and the trackout buffers, for identifying the sensitivity of the area.

Table 4.2: Summary of the Sensitivity of the Area to Dust Soiling and Human Health

Potential Impact		Sensitivity of the surrounding area			
		Demolition	Earthworks	Construction	Trackout
Dust soiling	Receptor sensitivity	High	High	High	High
	Number of receptors	10-100	10-100	10-100	10-100
	Distance from the source	<20m	<20m	<20m	<20m
	Overall Sensitivity of the Area	**High**	**High**	**High**	**High**
Human health	Receptor sensitivity	High	High	High	High
	Annual mean PM_{10} concentration	<24μg/m^3	<24μg/m^3	<24μg/m^3	<24μg/m^3
	Number of receptors	10-100	10-100	10-100	10-100
	Distance from the source	<20m	<20m	<20m	<20m
	Overall Sensitivity of the Area	**Low**	**Low**	**Low**	**Low**

Figure 4.1: Earthworks/Construction Activity Buffer Map

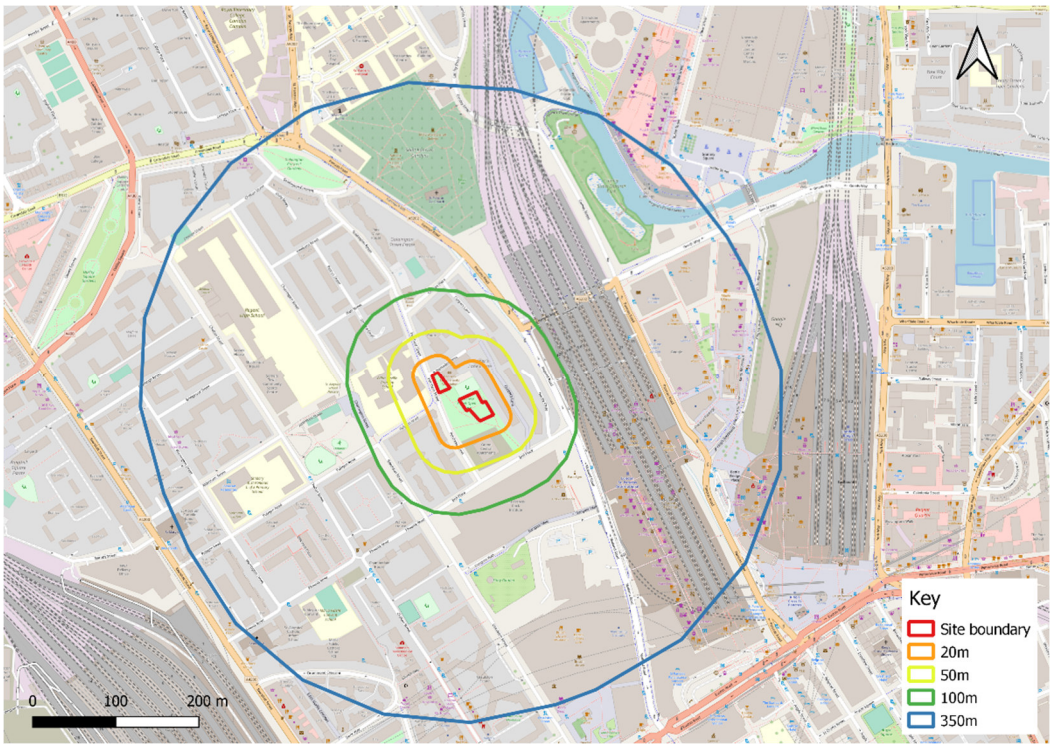


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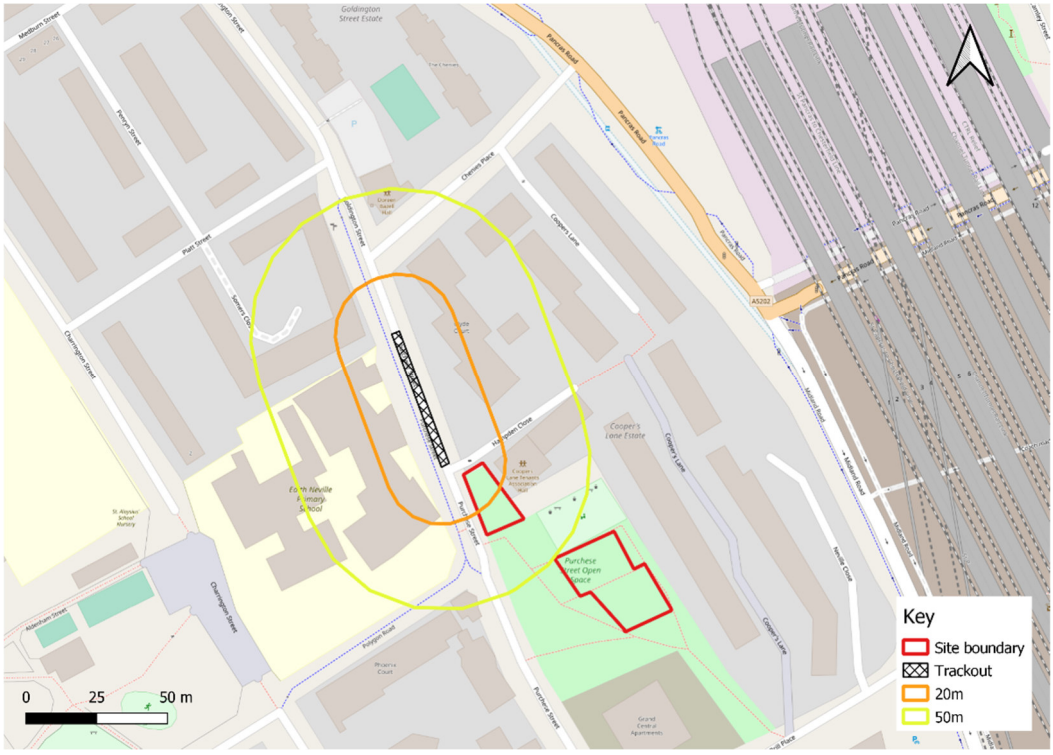
Figure 4.2: Trackout Activity Buffer Map



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4.1.4 Overall Dust Risks

Combining the dust emissions magnitude and the sensitivity of the surroundings, the overall dust risks associated with the proposed development were assessed and are presented in the below Table 4.3.

Table 4.3: Summary of the Dust Risk from all Construction Activities

Potential Impact	Dust Risk Impact			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	Medium Risk	Low Risk	Medium Risk	Medium Risk
Human health	Negligible	Negligible	Low Risk	Low Risk

The aim of this DMP is to specify appropriate mitigation such that, provided the mitigation is effectively applied, no significant effects are anticipated. Mitigation measures to reduce potential impacts, based on this assessment, are defined in Section 5.

5 CONTROL MEASURES AND MITIGATION

5.1 Mitigation measures

Mitigation measures recommended in the GLA SPG are divided into 'general measures', applicable to all sites and measures specific to demolition, earthworks, construction and trackout. Depending on the level of risk assigned to each site, different mitigation is recommended.

For those mitigation measures that are general, the highest risk assessed has been applied. In this case, the 'high risk' site mitigation measures have been applied, as determined by the dust risk assessment in Section 4. Two categories of mitigation measure are described in the IAQM guidance – 'highly recommended' and 'desirable', which are indicated according to the dust risk level identified in Table 4.3. Desirable measures are presented in *italics*.

Site Management

- Develop and implement a stakeholder communications plan that includes community engagement before work commence on site.
- Develop a Dust Management Plan (this document).
- Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary.
- Display the head or regional office contact information.
- Record and respond to all dust and air quality pollutant emissions complaints.
- Make the complaints log available to the local authority when asked.
- Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions.
- Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.

Preparing and Maintaining the Site

- Plan site layout: machinery and dust causing activities should be located away from receptors.

- Erect solid screens or barriers around dusty activities or site boundary that are at least as high as any stockpiles on site.
- Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- *Install green walls, screens or other green infrastructure to minimise the impacts of dust and pollution.*
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials from site as soon as possible.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary.
- *Provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust.*
- Agree monitoring locations with the Local Authority.
- Where possible, commence baseline monitoring at least three months before phase begins.
- Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.

Operating vehicle/machinery and sustainable travel

- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone.
- Ensure all vehicle switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment, where possible.
- Impose and signpost a maximum-speed-limit of 10mph on surfaced haul routes and work areas.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement the Travel Plan that supports and encourages sustainable travel.
- Details of all plant and machinery to be submitted to, and approved in writing by, the Local Planning Authority.
- An up-to-date list of all NRMM used on site will be maintained on the online register at https://nrmm.london/.
- All Non Road Mobile Machinery (NRMM) of net power of 37kW and up to and including 560kW used or present on site shall meet the emission standards set out in the Mayor of London's 'Control of Dust and Emissions During Construction and Demolition' Supplementary Planning Guidance 2014.

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 mitigation (using recycled water where possible).
- 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

- Reuse and recycle waste to reduce dust from waste materials
- No bonfires or burning of waste materials.

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 water suppression is used during demolition operations.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Specific to Earthworks

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

Specific to Construction

- Avoid scabbling 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 power materials ensure bags are sealed after use and stored appropriate to prevent dust.*

Specific to Trackout

- Regularly use a water-assisted dust sweeper on local roads, as necessary, to remove any material tracked out of the site.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport.
- Record all inspections of haul routes and any subsequent action in the 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.
- Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.
- Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.

Specific to Paving Works

- Using lower energy equipment like a block splitter.
- Limiting the number of cuts during design / lay-out.
- Getting material cut off-site and delivered.
- When a cut-off saw required, the following further measures would be required:
    - Water – use a hand-held cut-off saw with a water suppression attachment. Connect this to a supply of pressurised water container. Use water resistant markers if needed.
    - On-tool extraction – use a specially adapted equipment with on-tool extraction. Select an H or M class extraction unit. Make sure the extraction flow rate is right for the work. Hose connections should be tight fitting and secure without obvious leaks.
    - Respiratory Protective Equipment (RPE) – you also need RPE with an assigned protection factor of 20 (eg FFP3 disposable mask or half mask with a P3 filter). Make sure it is compatible with other items of personal protective equipment being worn. Fit testing is needed for tight fitting masks.

This DMP provides a robust suite of control and mitigation measures for the demolition, earthworks, construction and trackout. The dust emitting activities outlined in Section 4.1 can be effectively controlled by implementing the appropriate dust control measures detailed and any adverse effects can be greatly reduced or eliminated. As noted within the 2014 IAQM guidance, with the use of effective mitigation it is normally possible to minimise impacts and therefore the residual effect will normally be 'not significant'. With the implementation of the proposed control/mitigation measures, the residual impacts have therefore been considered to be negligible.

5.1.1 Reducing Emissions from Plant (Non-Road Mobile Machinery (NRMM))

NRMM is defined as any mobile machine, item of transportable industrial equipment, or vehicle - with or without bodywork - that is:

- Not intended for carrying passengers or goods on the road; or,
- Installed with a combustion engine - either an internal spark ignition petrol engine, or a compression ignition diesel engine.

The MOL SPG requires that plant used at the proposed development site meet emission Stage IIIB (all sites within Greater London) or IV (all sites within either the Central Activities ZONE (CAZ) or Opportunity Areas (OAs)) of the NOx, PM and CO emissions standards specified in the EU Directive 97/68/EC and subsequent amendments as a minimum, where they have net power of between 37kW and 560kW. The emissions standards vary depending on the net power the engine produces. The nominated site person(s) (NSP) will be required to maintain a record to confirm that equipment used on-site complies with these standards; further information is available at www.nrmm.london.

The following actions will be taken to enable compliance:

- Reorganising the fleet;
- Replacing equipment if required;
- Installing retrofit abatement technology (such as by diesel particulate filters in existing NRMM); and,
- 'Re-engining'.

Where equipment complying with the emissions standards is unavailable or a comprehensive refit of existing equipment is not feasible, the site operator and/or their appointed contractors would need to ensure that NRMM exempt from the policy are utilised.

5.1.2 Construction Logistics Plan

Deliveries to construction sites can contribute greatly to congestion and emissions at and around sites. It is recommended that a construction logistics plan is developed and implemented, with reference to factors such as the following:

- The consolidation of deliveries so fewer journeys are needed; and,

- The use of sustainable delivery methods where feasible, such as via a canal or railway.

A construction phase travel plan could also be implemented to encourage workers to use public transport, vehicle share and/or cycle to and from work as far as practicable. Consideration to mechanisms which could assist in the process should be considered

6 MONITORING RESIDUAL IMPACTS

Monitoring ambient pollutant levels during site activities can be used to:

- Demonstrate the efficiency of mitigation measures;
- Reduce costs by effective targeting of mitigation measures;
- Demonstrate compliance with regulatory or other standards;
- Demonstrate a commitment to reduce environmental impacts;
- Reduce complaints from site staff and the public;
- Reduce potential for conflict with regulators; and
- Speed up dispute resolution.

Monitoring regimes can range from real time, continuous monitoring to the visual assessment of dust generation. Simple and inexpensive monitoring of construction impacts may be conducted by means of a number of techniques, including dust deposition monitoring (e.g. by 'Frisbee' dust deposition gauge), and optical real-time continuous particle monitors (e.g. Nephelometers).

The risk of dust impacts from the site activities was identified in **Table** as a maximum of 'Medium risk' for disamenity and 'Low risk' for human health

In accordance with 'the MOL SPG', the IAQM 2014 and 2018 guidance, a monitoring campaign including visual dust observation, dust deposition monitoring (using 'Frisbee' dust deposition gauges) and indicative PM_{10} monitoring to provide near real time emissions management capability is recommended.

6.1 Visual Inspections and Site Logbook

The Site Manager should undertake regular visual inspections / observations of visible dust as is practicable or where they suspect high levels of dust-generating activities may occur. A visual inspection should be undertaken whenever a complaint regarding dust generation is received. The extent of the inspection will generally be on-site but should be extended to the trackout routes, especially on days with heavy traffic movements in and out of the site. These may include 'exceptional incidents', such as very dry, windy days; days when dust suppression techniques fail; etc.

The findings of visual inspections should be documented, and mitigation measures reviewed and implemented as appropriate. The logbook entry should include:

- Time & date;
- Reason for inspection (e.g. complaint received, regular inspection);

- Confirmation of any visible dust emissions and that these are being generated on site (and are thus within the control of site);
- Remedial actions taken if dust observed; and
- Wind direction and strength (a weather station or knowledge of the Beaufort Scale would assist in this process).

6.2 Dust Deposition Monitoring

The deposition of dust on surfaces may be one of the main causes of air pollution complaints from demolition, earthwork and construction activities. For this reason, it is recommended that a total of two 'Frisbee' dust deposition gauges or equivalent be installed close to the site boundary close to sensitive receptors as shown in **Figure 6-1** below. The 'Frisbee' dust deposition gauge, developed by the Stockholm Environment Institute (SEI) at the University of York, is established as a simple and robust method for the quantification of dust deposition. Dust is collected on a horizontal surface and collection bottle. The dust is determined gravimetrically on a filter paper in the laboratory.

The monitoring locations are suggested to be located near the sensitive receptors and along site boundaries. It is recommended that dust deposition monitoring is undertaken and maintained throughout the demolition and earthworks and initial construction works period. 'Frisbee' samples should be sent to an accredited laboratory for analysis.

The final selection of monitoring locations may be subject to a degree of change prior to their installation, depending on practical issues on the site. Monitoring locations may also need to be moved at a later stage for various reasons, during the build out of site, subject to the agreement of all relevant parties.

It is proposed that the Frisbee samples are changed every 4 weeks/monthly. The results will be compared with the Suggested Guidelines for Deposited Ambient Dust (published by Vallack & Shillito), with a trigger value of 200mg/m^2/day considered given the 'residential areas & urban outskirts' setting of the site.

6.3 PM_{10} Monitoring using Real-Time Dust Monitors

In addition to Frisbee dust deposition monitoring it is recommended that real-time monitoring is undertaken at site.

Nephelometer instruments, such as the Turnkey Osiris unit, are not a reference equivalent method for the determination of airborne particulates. However, they do provide continuous data in near real-time that may be related to site events and are considered an appropriate and economical technique for this type of application.

These instruments measure continuous indicative concentrations of the PM_{10} fraction of suspended particle matter and the data are posted in near real-time to a website and are immediately viewable.

A Sight Action Threshold (SAT) level of 190µg/m^3 (1-hour average PM_{10}), as recommended in the IAQM 2018 guidance, will be adopted for the site. If this level is reached, an email will be sent to the air quality team at RSK and the Site Manager.

If the Site Manager receives an email stating that the SAT has been exceeded, the following actions should be taken:

- Review the activities on site and determine if there is dust being generated from on-site activities;
- If the exceedance is deemed to be from the site activities, apply additional mitigation as soon as is practicable;
- These additional mitigation measures would be agreed with the Site Manager and will remain in place until a time that the ambient PM_{10} concentrations are below the SAT; and
- The occurrence should be recorded as a 'dust incident' or similar in the complaints log.

Where the Site Manager is not able to carry out these tasks, it should be ensured that a nominated person is on site in their absence.

Monthly reports should also be prepared. These reports should detail the monitoring programme and the activities undertaken during the monitoring period, particulate matter concentrations at all monitoring locations, discussion of any exceedances, the receipt of any dust complaints received, and description of any mitigation activities applied. Reports will be submitted via the LLDC's Environmental Forum.

6.4 Proposed Reporting Programme

It is recommended that monthly reports are prepared by the developers' air quality consultant. The content of the reports may vary according to future requirements of the programme, but it is anticipated that the reports will contain the following:

- Details of the monitoring programme and of the enabling activities undertaken during the monitoring period;
- Presentation of dust deposition rates and particulate matter concentrations at all monitoring locations;
- Discussion/explanation of any exceedances of the relevant standards; and
- Description of mitigation activities applied following dust episode(s) or the receipt of complaints from on-site personnel/ off-site receptors in relation to the identified enabling activities.

7 IMPLEMENTATION AND MANAGEMENT

7.1 Implementation of AQDMP

The Site Manager (or other nominated person, as appropriate) shall be responsible for the control of environmental impacts of construction activities. The Site Manager should be provided with appropriate training so that they are aware of how dust and particulate matter can be generated on site, are aware of the requirements of the AQDMP and are aware of the routine and emergency procedures designed to control dust emissions.

The Site Manager or nominated person should contribute to site inductions and refresher training for all site personnel (as detailed below), detailing how responsibility for dust emissions management should be delegated. It is recommended that the new members of staff are also provided with dust awareness training, covering the sources of dust and PM on site, the health and environmental impacts of emissions to air, general emissions control measures being utilised on site. They should also be made aware of what actions they could take when they observe others breaching site rules or where they observe elevated dust concentrations.

As detailed in Section 6, the Site Manager or nominated person will keep a site log book documenting the maintenance of effective emissions control methods and details of any complaints or incidents, and actions taken.

Emissions control procedures and equipment will only work satisfactorily if carried out or used appropriately. The responsible person shall maintain good housekeeping and ensure that all equipment is well maintained and used appropriately.

7.1.1 Reactive mitigation measures

Following reports made by site personnel of visibly elevated concentrations of dust or following dust-related complaints from third parties or nephelometer SAT alert emails, it is recommended that an investigation is carried out, documented and appropriate mitigation is applied.

The Site Manager should be responsible for ensuring that appropriate steps are taken to minimise the impacts of the dust event. Appropriate mitigation may include but not necessarily be limited to the following:

- Erect solid screens or barriers around the activities generating the elevated dust/ PM concentrations that are at least as high as the dust-generating activity;
- Cover or dampen stockpiles or other sources of dust (e.g. on-site haul roads) to reduce fugitive dust;
- Ensure that site personnel have switched off machinery when not in use and that all personnel are adhering to site speed limits;

- Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible);
- Ensure that the other mitigation methods identified in Section 5 are complied with by undertaking visual inspections; and
- Clean up any dry spillages using wet cleaning methods.

It may be appropriate to temporarily suspend particularly dusty site activities where dust concentrations are high. For example, during abnormal circumstances where dust suppression equipment malfunctions or 'emergency' circumstances.

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APPENDIX A

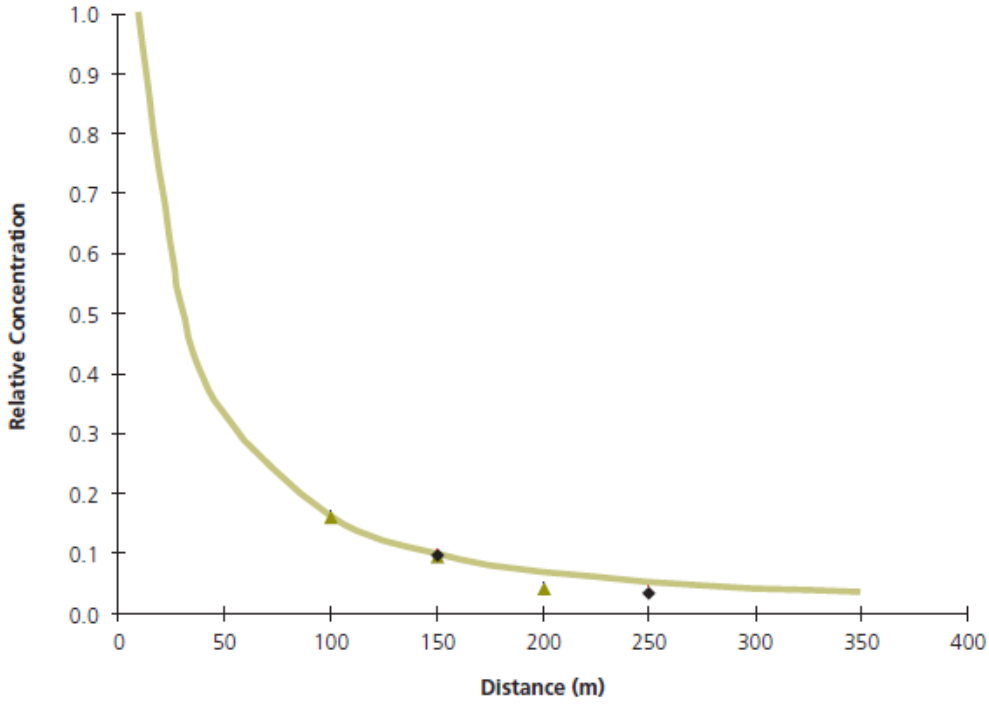
CONSTRUCTION DUST ASSESSMENT METHODOLOGY

This appendix contains the construction dust assessment methodology used in the assessment. To assess the potential impacts, construction activities are divided into demolition, earthworks, construction and trackout. The descriptors included in this section are based upon the MOL SPG which itself is based on the IAQM construction dust guidance. The assessment follows the steps recommended in the guidance.

Step 1 and Step 2 methods from the IAQM guidance are described in this Appendix to assign dust risk categories for each of the construction activities.

The tendency of dust to remain airborne is determined by the particle size and weather conditions. Eventually, particles will drop from suspension as a deposit. The previous Local Air Quality Management Technical Guidance document (LAQM.TG(03))[3] identifies that PM_{10} concentrations fall-off rapidly with distance from source. Figure B1 shows the fall-off in PM_{10} concentration from source for a typical wind speed of 6m/s. At 100m from source, the PM_{10} concentration is predicted to be less than 20% of that at the point of generation.

Figure A1: Typical Fall-off in PM_{10} Concentration with Distance from Source



[3] LAQM TG (03). The Local Air Quality Management Technical Guidance Note published by the Department for Food and Rural Affairs in 2003. This guidance note is revised in 2021 and is available as LAQM TG(16).

Step 1: Screen the requirement for assessment

The first step is to screen out the requirement for a construction dust assessment; this is usually a somewhat conservative level of screening. An assessment is usually required where there is:

- a 'human receptor' within:
    - 350m of the boundary of the site; or
    - 50m of the route used by construction vehicles onto the public highway, up to 500m from the site entrance(s).
- an 'ecological receptor':
    - 50m of the boundary of the site; or
    - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

Step 2A: Defining the Potential Dust Emission Magnitude

Demolition

The dust emission magnitude category for demolition is varied for each site in terms of timing, building type, duration and scale. Examples of the potential dust emission classes are provided in the guidance as follows:

- **Large**: Total building volume >50,000m^3, potentially dusty construction material, on-site crushing and screening, demolition activities >20m above ground level;
- **Medium**: Total building volume 20,000m^3 – 50,000m^3, potentially dusty construction material, demolition activities 10m – 20m above ground level; and,
- **Small**: Total building volume <20,000m^3, construction material with low potential for dust release, demolition activities <10m above ground, demolition during wetter months.

Earthworks

The dust emission magnitude category for earthworks is varied for each site in terms of timing, geology, topography and duration. Examples of the potential dust emission classes are provided in the guidance as follows:

- **Large**: Total site area >10,000m^2, potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes;
- **Medium**: Total site area 2,500 – 10,000m^2, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8m in height, total material moved 20,000 – 100,000 tonnes; and,
- **Small**: Total site area < 2,500m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <20,000 tonnes, earthworks during wetter months.

Construction

The dust emission magnitude category for construction is varied for each site in terms of timing, building type, duration, and scale. Examples of the potential dust emissions classes are provided in the guidance as follows:

- **Large**: Total building volume >100,000m^3, on site concrete batching;

- **Medium**: Total building volume 25,000 – 100,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and,
- **Small**: Total building volume <25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

Factors which determine the dust emission magnitude class of trackout activities are vehicle size, vehicle speed, vehicle number, geology and duration. Examples of the potential dust emissions classes are provided in the guidance as follows:

- **Large**: >50 HDV (>3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- **Medium**: 10 – 50 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100m; and,
- **Small**: <10 HDV (>3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50m.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health and ecosystems. The sensitivity of the area takes into account the following factors:

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

Table B1 has been used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table A1: Sensitivity of Individual receptors in the area surrounding the Site

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
High	• Users can reasonably expect an enjoyment of a high level of amenity. • 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. • Examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	• Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) • Examples include residential properties, hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	• Locations with an international or national designation *and* the designated features may be affected by dust soiling. • Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. • Examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
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. • The appearance, aesthetics or value of their property could be diminished by soiling. • 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. • Examples include parks and places of work.	• Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). • Examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.	• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. • Locations with a national designation where the features may be affected by dust deposition. • Example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
Low	• The enjoyment of amenity would not reasonably be expected. • Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. • 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. • Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.	• Locations where human exposure is transient. • Indicative examples include public footpaths, playing fields, parks and shopping streets.	• Locations with a local designation where the features may be affected by dust deposition. • Example is a local Nature Reserve with dust sensitive features.

Based on the sensitivities assigned of the different types of receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification for the area can be defined for each. Tables B2 to B4 indicate the method used to determine the sensitivity of the area for dust soiling, human health and ecological impacts, respectively.

For trackout, as per the guidance, it is only considered necessary to consider trackout impacts up to 50m from the edge of the road.

Table A2: Sensitivity of the area to dust soiling effects on people and property

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

Table A3: Sensitivity of the area to Human Health Impacts (from the IAQM construction dust guidance)

Receptor Sensitivity	Annual Mean PM_{10} Conc.	Number of Receptors	Distances from the Source (m)				
			<20	<50	<100	<200	<350
High	>32µg/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low

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

Table A4: Sensitivity of the area to Ecological Impacts

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

<u>Step 2C</u>: Defining the Risk of Impacts

The final step is to use both the dust emission magnitude classification with the sensitivity of the area, to determine a potential risk of impacts for each construction activity, before the application of mitigation. Tables B5 to B7 indicate the method used to assign the level of risk for each construction activity.

Table A5: Risk of Dust Impacts from Demolition

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

Table A6: Risk of Dust Impacts from Earthworks/Construction

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

Table A7: Risk of Dust Impacts from Trackout

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