DUST RISK ASSESSMENT

THEATRE SQUARE

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DUST RISK ASSESSMENT

1 Introduction

This dust risk assessment forms part of the planning discharge for Theatre Square Project in Swiss Cottage.

2 Methodology

The dust risk assessment has been undertaken in accordance with the Institute of

Air Quality Management (IAQM) guidance.

The risk of dust emissions from construction/demolition activities causing an adverse

effect on human or ecological receptors depends on:

- the type of construction activities being undertaken, and the duration of these
- activities;
- the size of the construction site;
- the meteorological conditions (such as wind speed, wind direction and rainfall);
- the proximity of the receptors to the construction activities;
- the effectiveness of the dust mitigation measures; and
- receptors' sensitivity to dust.

Activities within the proposed site boundary and its vicinity have been divided into

four types to reflect their different potential effects. These are:

- demolition;
- earthworks;
- construction; and
- trackout of mud and debris onto the highway.

The potential for dust emissions was assessed for each activity that is likely to take

place and considers three separate dust effects:

- annoyance due to dust soiling;
- harm to ecological receptors; and
- the risk of health effects due to an increase in exposure to PM10 (Particulate Matter less than or equal to 10 microns in size).

The assessment steps are detailed below.

Step 1

Step 1 screens the requirement for a more detailed assessment. An assessment will

normally be required where there is:

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

for large sites, up to 200m from medium sites and 50m from small sites. Should sensitive receptors not be present within the relevant distances then negligible effects would be expected and further assessment is not necessary.

Step 2

Step 2 assesses the risk of potential dust effects for each of the four types of construction activity. A site is allocated a risk category (Step 2C) based on two steps:

- Step 2A: The scale and nature of the works, which determines the magnitude of potential dust emissions as small, medium or large.
- Step 2B: The sensitivity of the area to dust effects, which is defined as low, medium or high sensitivity.

Step 2A

The magnitude of potential unmitigated dust emissions is determined based on the criteria shown in Table 2.A.1.

Table 2.A.1 Construction dust – magnitude of emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 50,000m3 • Potentially dusty construction material (e.g concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level
	Earthworks	• Total site area greater than 10,000m2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than ten heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved
	Construction	• Total building volume greater than 100,000m3 • On site concrete batching • Sandblasting
	Trackout	• Greater than 50 Heavy Duty Vehicle (HDV) (greater than 3.5 tonnes) outward movements in any one day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Demolition	• Total building volume 20,000m3 - 50,000m3

	Earthworks	• Potentially dusty construction material • Demolition activities 10-20m above ground level • Total site area 2,500m2 to 10,000m2 • Moderately dusty soil type (e.g. silt) • Five to ten heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m3 to 100,000m3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10-50 HDV (greater than 3.5 tonnes) outward movements in any one day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Demolition	• Total building volume less than 20,000m3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 10m above ground
	Earthworks	• Demolition during wetter months • Total site area less than 2,500m2 • Soil type with large grain size (e.g. sand) • Less than five heavy earth moving vehicles active at any one time • Formation of bunds less than 4m in height • Total material moved less than 20,000 tonnes • Earthworks during wetter months
	Construction	• Total building volume less than 25,000m3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV (greater than 3.5 tonnes) • outward movements in any one day • Surface material with low potential for dust release • Unpaved road length less than 50m

Step 2B

The sensitivity of the area takes 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, such as trees, to

reduce the risk of wind-blown dust.

Table 2.A.2 provides guidance on determining the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table 2.A.2 Guidance on the sensitivity of types of receptor to dust soiling, health effects and ecological effects

	High sensitivity receptor	**Medium sensitivity receptor**	**Low sensitivity receptor**
Sensitivities of people to dust soiling effects	• Users can reasonably expect an 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. • Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	• 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 would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • Indicative examples include parks and places of work.	• The enjoyment of amenity would not reasonably be expected; or • Property 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. • Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads.
Sensitivities of people to the health effects of PM10	• Locations where members of the public are exposed over a time period relevant to the	• Locations where the people exposed are workers, and exposure is over a time period	• Locations where human exposure is transient. • Indicative examples include public footpaths,

	air quality objective for PM10 (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). • Indicative 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 the assessment	relevant to the air quality objective for PM10 (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). • Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM10, as protection is covered by Health and Safety at Work legislation.	playing fields, parks and shopping streets.
Sensitivities of ecological receptors to dust effects	• 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 such as vascular species included in the Red Data List for Great Britain • Indicative examples include a SAC designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing	• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation where the features may be affected by dust deposition • Indicative example is a SSSI with dust sensitive features.	• Locations with a local designation where the features may be affected by dust deposition. • Indicative example is a local Nature Reserve with dust sensitive features.

	concrete (alkali) buildings

Following identification of the receptor sensitivity, the sensitivity of the area to dust soiling, human health and ecological effects is determined using Table 2.A.3, for each of the four activities (demolition, construction, earthworks and trackout).

Table 2.A.3

Receptor Sensitivity	**Annual Mean PM10 Concentration**	**Number of Receptors**	Distance from source (m)				
			<20	<50	<100	<200	<350
Dust soiling effects							
High	n/a	>100	High	High	Medium	Low	Low
	n/a	10-100	High	Medium	Low	Low	Low
	n/a	1-10	Medium	Low	Low	Low	Low
Medium	n/a	>1	Medium	Low	Low	Low	Low
Low	n/a	>1	Low	Low	Low	Low	Low
Health impacts							
High	>32µg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Medium	Low
		1-10	High	Medium	Low	Low	Low
	28-32µg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Medium	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
	<24µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	n/a	>10	High	Low	Low	Low	Low
	n/a	1-10	Medium	Low	Low	Low	Low
Low	n/a	>1	Low	Low	Low	Low	Low
Ecological effects							
High	n/a	n/a	High	Medium	n/a	n/a	n/a
Medium	n/a	n/a	Medium	Low	n/a	n/a	n/a
Low	n/a	n/a	Low	Low	n/a	n/a	n/a

* In the case of high sensitivity receptors with high occupancy (such as schools or hospitals), receptor number is approximate of the number of people likely to be present. In the case of residential dwellings, receptor number is just the number of properties.

The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust effects during the construction phase.

- Any history of dust generating activities in the area.
- The likelihood of concurrent dust generating activity on nearby sites.
- Any pre-existing screening between the source and the receptors.
- Any conclusions drawn from analysing local meteorological data which accurately

represent the area; and if relevant the season during which works will take place.
- Any conclusions drawn from local topography.
- Duration of the potential effect, as a receptor may become more sensitive over time.
- Any known specific receptor sensitivities which go beyond the classifications given in the document

Step 2C

The risk of effects with no mitigation applied is then defined based upon the interaction between the magnitude of emission and the highest level of area sensitivity (determined in Steps 2A and 2B, respectively) for each construction activity. The matrices presented in Table 2.A.4 provide a method of assigning the level of risk for each activity.

Table 2.A.4 Risk of dust effects

Sensitivity of 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 activities			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Step 3

Step 3 requires the identification of site specific mitigation measures to reduce potential dust effects based upon the relevant risk categories identified in Step 2. For sites with negligible risk, mitigation measures beyond those required by legislation are not required.

Step 4

Once the risk of dust effects has been determined in Step 2C and the appropriate

dust mitigation measures identified in Step 3, the final step is to determine whether

there are significant effects arising from the construction phase of a proposed development. This is based on professional judgement but takes account of the

significance of the effects for each of the potential dust generating activities.

For almost all construction activity, the aim should be to prevent significant effects

on receptors through the use of effective mitigation.

3 Risk Assessment

Step 1

The desk-study undertaken to inform the baseline identified a number of sensitive

receptors within 350m of the site boundary. As such, a dust risk assessment has been undertaken.

The dust risk assessment has considered the Order limits for the proposed development in

determining the site risk, given that the Order limits represent where potential

development activities would take place. The public highway routes that extend

beyond the Order limits, in order to connect to the wider road network for example,

are also taken into account.

Step 2A

Demolition

- Establishment of site welfare, boundary controls and access points – vehicle and pedestrians.
- Notification and removal of asbestos containing materials.
- Erection of hoardings
- Demolition of the external staircase along Avenue Road prior to the main demolition works
- Installation of loading gantry in Avenue Road.
- Soft strip of the existing building prior to demolition, including the removal of M & E plant, and the removal of
- lift car and supplementary equipment.
- Demolition of all structures on the site down to and including the ground bearing slabs and foundations.
- Disconnection and isolation of existing services back to the site boundary.

Earthworks

- Removal of disused underground storage tanks and associated pipework/drainage.

Construction

- Installation of any temporary works (if necessary) to enable demolition.

Trackout

As there is little groundwork being carried out, there is less risk for tracking mud and debris across the local road network. It is considered that the potential effect on the local receptors be low as there will damping of the haul routes in and out of site reducing potential dust emissions.

The dust emission magnitude for the proposed development is summarised in Table

2.A.5

Table 2.A.5 Dust emission magnitude summary

Activity	**Dust emission magnitude**
Demolition	High
Earthworks	High
Construction	Medium
Trackout	Low

Step 2B

There are multiple receptors within the vicinity of the proposed development.

The sensitivities of the areas have been determined following Table 2.A.2 and

Table 2.A.3 and for each construction activity, and are summarised in Table 2.A.6

Table 2.A.6

Potential effect	**Sensitivity of the surrounding area**			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	Medium	Low
Human Health	High	High	Low	Low
Ecological	Low	Low	Low	Low

Step 2C

The risk of effects with no mitigation applied was then defined based upon the

interaction between the magnitude of emission and the highest level of area

sensitivity (determined in Steps 2A and 2B, respectively) for each construction

activity. Using the matrices presented in Table 2.A.4, the risk of dust effects was determined, as presented in Table 2.A.7

Table 2.A.7

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Fit Out
Dust Soiling	High Risk	High Risk	Medium Risk	Low Risk
Human Health	High Risk	Medium Risk	Medium Risk	Low Risk
Ecological	Negligible	Negligible	Negligible	Negligible

It should be noted that the potential for effects depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the proposed Order limits boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

Step 3

Based on the risk ratings presented in Table 2.A., environmental measures have been proposed to reduce the potential effects, as summarised in Table 2.A.8. These measures are derived from the IAQM guidance and have been adapted for the proposed development, based on the worst case risk for each construction activity. As the worst case risk for each activity is the same for all Sections, the measures have been combined.

Table 2.A.8 Mitigation Measures

Measure	**High Recommended (H) or Desirable (D) Measure**
Site Management	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site	H
Develop a Dust Management Plan or equivalent	H
Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary	H
Display the head or regional office contact information.	H
Record and respond to all dust and air quality pollutant emissions complaints.	H
Make a complaints log available to the local authority when asked.	H
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.	H
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	H
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.	H
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.	D
Preparing and Maintaining the Site	
Plan site layout: machinery and dust causing activities should be located away from receptors.	H

Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site.	H
Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	H
Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution.	H
Avoid site runoff of water or mud.	H
Keep site fencing, barriers and scaffolding clean using wet methods.	H
Remove materials from site as soon as possible.	D
Cover, seed or fence stockpiles to prevent wind whipping.	D
Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary.	D
Provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust.	H
Agree monitoring locations with the Local Authority.	H
Where possible, commence baseline monitoring at least three months before phase begins.	D
Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.	H
Operating vehicle/machinery and sustainable travel	
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone.	H
Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance.	H
Ensure all vehicles switch off engines when stationary – no idling vehicles.	H
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible.	D
Impose and signpost a maximum-speed-limit of 10mph on surfaced haul routes 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).	H
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	H
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	H
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.	H
Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible).	H
Use enclosed chutes, conveyors and covered skips	H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
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.	H
Waste Management	
Reuse and recycle waste to reduce dust from waste materials	H
Avoid bonfires and burning of waste materials.	H
Bag and remove any biological debris or damp down such material before demolition.	H
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).	H
Ensure water suppression is used during demolition operations.	H
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H

Bag and remove any biological debris or damp down such material before demolition.	H