
CHAPTER 7

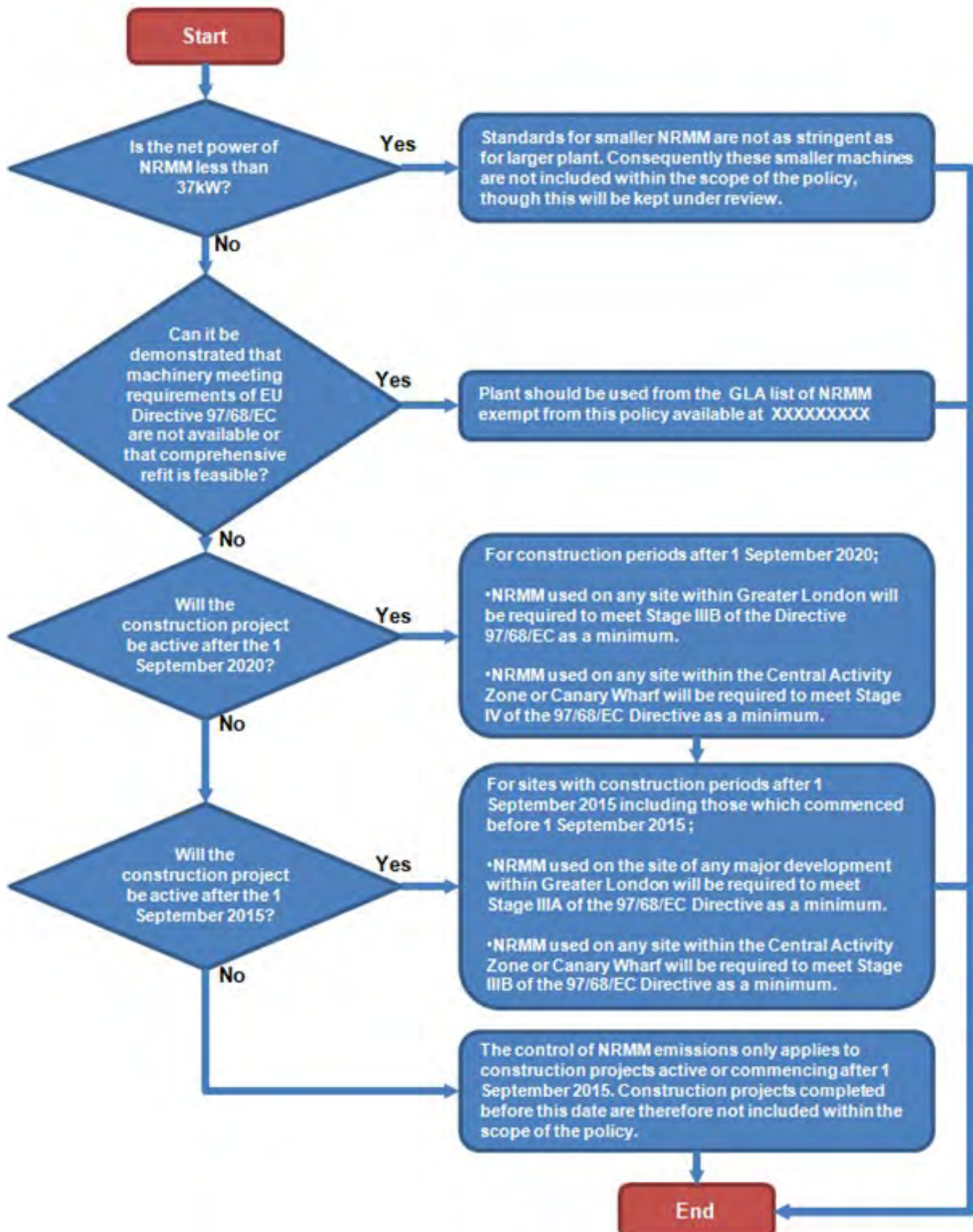
CLEANER CONSTRUCTION MACHINERY FOR LONDON: A LOW EMISSION ZONE FOR NON-ROAD MOBILE MACHINERY

- 7.1 Since 2008, heavy duty diesel road vehicles have had to meet emissions standards for PM to avoid being charged for travelling within the London Low Emission Zone (LEZ). The Mayor has recently announced his intention to introduce an ultra low emission zone in central London from 2020. This will require all vehicles to be either zero or ultra low emission.
- 7.2 It is also important to take action to reduce emissions from non-road mobile machinery (NRMM) to protect and improve Londoners' health. The latest version of the London Atmospheric Emissions Inventory estimates that in 2010 the NRMM used on construction sites was responsible for 12% of NO_x emissions and 15% of PM₁₀ emissions in Greater London.
- 7.3 To address this significant contribution by non-road mobile machinery to London's poor air quality the GLA will seek to control the emissions from this equipment from 2015 by establishing emissions standards for London. This will apply to development from 1st September 2015 and is included to give developers notice so that they can develop their supply chain and so the boroughs can develop procedures to secure, monitor and enforce these standards through the planning system.
- 7.4 Officers from the Greater London Authority have been liaising with the London Boroughs, construction industry representatives, manufacturers, the retrofit industry and the construction plant hire association to agree robust standards for NRMM operating in London. This approach is the outcome of these discussions. The approach is summarized by Figure 7.1.

2015 EMISSION STANDARDS

- 7.6 From 1 September 2015 NRMM of net power between 37kW and 560kW used
- in London will be required to meet the standards set out below. This will apply to both variable and constant speed engines for both NO_x and PM. These standards will be based upon engine emissions standards set in EU Directive 97/68/EC and its subsequent amendments.
 - NRMM used on the site of any major development within Greater London will be required to meet Stage IIIA of the Directive as a minimum; and
 - NRMM used on any site within the Central Activity Zone or Canary Wharf will be required to meet Stage IIIB of the Directive as a minimum.
- 7.7 From 1 September 2020 the following will apply:
- NRMM used on any site within Greater London will be required to meet Stage IIIB of the Directive as a minimum.
 - NRMM used on any site within the Central Activity Zone or Canary Wharf will be required to meet Stage IV of the Directive as a minimum.
- 7.8 The requirements set out in paragraphs 7.6 and 7.7 may be met using the following techniques;
- Reorganisation of NRMM fleet
 - Replacing equipment (with new or second hand equipment which meets the policy)
 - Retrofit abatement technologies
 - Re-engining

FIGURE 7.1 SUMMARY OF NRMM EMISSIONS REQUIREMENTS FROM 2015



7.9 In developing this approach there has been an appreciation of the potential impact on small businesses and the associated potential equalities impact. In recognition of this, the 2015 standards for the Non-Road Mobile Machinery Low Emission Zone will only apply to major developments in outer London, thus removing small operators from the scope of the proposals until 2020. It is expected that this additional compliance time will significantly reduce costs imposed on small operators.

7.10 All eligible NRMM should meet the standards above unless it can be demonstrated that the machinery is not available or that a comprehensive retrofit to meet both PM and NO_x emission standards is not feasible. In this situation every effort should be made to use the least polluting equipment available including retrofitting technologies to reduce particulate matter emissions.

7.11 It is recognised that some NRMM plant is not yet widely available in the numbers required to meet the above standards and that the options for retrofitting or re-engining are currently cost prohibitive. As such the GLA will publish a list of NRMM that is exempt from this policy. This list will be reviewed regularly.

7.12 At present, the standards for smaller NRMM (19kW to 37Kw) are not as stringent as for larger plant. Consequently these smaller machines are not included within the scope of the policy, though this will be kept under review.

7.13 These NRMM emissions standards will apply to all construction projects which are active from September 2015 including those which commenced before this date.

Developers should begin to put processes in place to ensure their supply chain can meet these standards, where possible.

Compliance with the Non-Road Mobile Machinery (NRMM) policy

- 7.14 The LPAs will be responsible for the application and enforcement of this policy through the planning process.
- The compliance with the NRMM standards should be secured by the local authorities as a planning condition or s106 agreement. An example condition has been included in Appendix 2.
 - It is acknowledged that developers may not know what equipment will be required during construction at planning application stage, therefore as part of their Air Quality Dust Risk Assessment (AQDRA) developers will be required to provide a written statement of their commitment and ability to meet these standards. This statement will be used by the local authority for the purposes of monitoring and enforcement.
 - An inventory of all NRMM should be kept on-site stating the emission limits for all equipment. All machinery should be regularly serviced and service logs kept on-site for inspection. This documentation should be made available to local authority officers as required.
 - The Considerate Constructors Scheme will play a role in reviewing the levels of compliance with this policy across London as part of their audit activities at the construction sites of their members. Given the importance of this policy boroughs are strongly encouraged to ensure developers sign up to the Considerate Constructors Scheme to assist with monitoring compliance.
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ENDNOTES

¹ Institute of Occupational Medicine, Report on estimation of mortality impacts of particulate air pollution in London, 2010.

² In the UK the maximum permitted sulphur content of fuels used in road and off-road applications is 10ppm, and therefore sulphur dioxide is no longer a significant pollutant from these sources.

³ Save Britain's Heritage v Secretary of State for Communities and Local Government [2011] EWCA Civ 334.

⁴ Approval under the Buildings Act 1984 is required for demolition.

⁵ This objective is supported by paragraphs 1.56 and 1.57 of the London Plan.

⁶ The transportation of dust and materials on the wheels of vehicles

⁷ http://www.iaqm.co.uk/text/guidance/construction_guidance_2014.pdf

⁸ The glossary provides definitions of these activities.

⁹ NO_x is mainly generating by the operation of equipment and vehicles and is address in Chapter 7 Cleaner Construction Machinery for London

¹⁰ The EU air quality limits

¹¹ The EU air quality limits

¹² Committee on the Medical Impacts of Air Quality www.comeap.org.uk

¹³ <http://pubs.acs.org/doi/abs/10.1021/>

es300826w

¹⁴ This could prevent London meeting its requirements under the Water Quality Directive.

¹⁵ www.environment-agency.gov.uk

¹⁶ <http://www.tfl.gov.uk/assets/downloads/corporate/evaluation-dust-suppressants-pmconcentrations.pdf>

¹⁷ Permanent weather stations are only operated at few locations in and around London. Ideally a minimum of 12 months data should be used.

¹⁸ Tapered Element Oscillating Monitor

GLOSSARY

		HSE	Health and Safety Executive
ALG	Association of London Government	HPA	Health Protection Agency
AQMA	Air Quality Management Area	ICE	Institution of Civil Engineering
AQS	Air Quality Strategy	AQM	Local Air Quality Management
BRE	Building Research Establishment	LAPC	Local Air Pollution Control
CIRIA	Construction Industry Research and Information Association	LAPPC	Local Air Pollution and Prevention Control
CIWM	Chartered Institute of Waste Management	LEV	local exhaust ventilation
COMEAP	Committee of Medical Effects of Air Pollution	LEZ	Low Emission Zone
CNG	Compressed Natural Gas	LFEPa	London Fire and Emergency Planning Authority
COSHH	Control of Substances Hazardous to Health	LPG	Liquefied Petroleum Gas
CTRL	Channel Tunnel Rail Link	NO ₂	Nitrogen Dioxide
DEFRA	Department of Environment, Food and Rural Affairs	NO _x	Oxides of Nitrogen Oxides
DPF	Diesel Particulate Filter	NRMM	Non-Road Mobile Machinery
Dust	All airborne particle matter	PG	Process Guidance
EA	Environment Agency	PM _{2.5}	Fine particles with a diameter less than 2.5 micro-metres
EPA 1990	Environmental Protection Act (1990)	PM ₁₀	Particles with a diameter less than 10 micro-metres
EST	Energy Saving Trust	QA/QC	Quality Assurance/Quality Control
GLA	Greater London Authority	RPC	Reduced Pollution Certificate
HGV	Heavy Goods Vehicle	SAC	Special Area of Conservation (EU Habitats Directive)

SPA	Special Protection Area (EU Birds Directive)
SPG	Supplementary Planning Guidance
SSSI	Site of Special Scientific Interest
TEOM	Tapered Element Oscillating Monitor
TfL	Transport for London
Track out	The transportation of dust and materials on the wheels of vehicles
TSP	Total Suspended Particles
ULSD	Ultra Low Sulphur Diesel (present UK specification is EN590:2004)
VOC	Volatile Organic Compounds

APPENDIX 1 UK AIR QUALITY OBJECTIVES IN THE NATIONAL AIR QUALITY STRATEGY

AIR QUALITY STRATEGY OBJECTIVES IN AIR QUALITY REGULATIONS

Pollutant	Air quality objective	Concentration measured as	Date
Fine particles (PM10)	No more than 35 days above 50 µg/m ³	Daily mean	31st Dec 04
	40 µg/m ³	Annual mean	31st Dec 04
	No more than 10 days above 50 µg/m ³	Daily mean	31st Dec 10*
	23 µg/m ³	Daily mean	31st Dec 10*
Nitrogen dioxide	No more than 18 hours above 200 µg/m ³	Annual mean	31st Dec 05
	40 µg/m ³	Hourly mean	31st Dec 05
Sulphur dioxide	No more than 24 hours above 350 µg/m ³	Hourly mean	31st Dec 04
	No more than 3 days above 125 µg/m ³	Daily mean	31st Dec 04
	No more than 35 times above 266 µg/m ³	15 minute mean	31st Dec 05
Carbon monoxide	Maximum 10 mg/m ³	Running 8 hour mean	31st Dec 03*
Benzene	5 µg/m ³	Annual mean	31st Dec 10
1,3 butadiene	2.25 µg/m ³	Running annual mean	31st Dec 03
Lead	0.5 µg/m ³	Annual mean	31st Dec 04
	0.25 µg/m ³		31st Dec 08

MAXIMUM EXPOSURE LIMITS (MEL) USED TO ENFORCE THE HEALTH AND SAFETY AT WORK ACT 1974

Substances that may cause most serious health effects for which “no adverse effect level” can be determined

Material	Long term MEL (8h TWA) mg/m³
Hardwood dust	5
Softwood dust	5
Silica (Respirable crystalline)	0.3
Man-made mineral fibre	5

OCCUPATIONAL HEALTH STANDARDS

MATERIAL	FRACTION	LONG TERM MEL (8H TWA) MG/M3
Calcium carbonate	Inhalable	10
	Respirable	4
Calcium silicate	Inhalable	10
	Respirable	4
Coal Dust	Respirable	2
Emery	Inhalable	10
	Respirable	4
Gypsum	Inhalable	10
	Respirable	4
Limestone	Inhalable	10
	Respirable	4
Marble	Inhalable	10
	Respirable	4
Mica	Inhalable	10
	Respirable	4
Plaster of Paris	Inhalable	10
	Respirable	4
Portland Cement	Inhalable	10
	Respirable	4

MATERIAL	FRACTION	LONG TERM MEL (8H TWA) MG/M3
Ground granulated blast furnace slag	Inhalable	10
	Respirable	4
Pulverised Fuel Ash	Inhalable	10
	Respirable	4
Silica (amorphous)	Inhalable	6
	Respirable	2.4
Silica (fused)	Respirable	0.08
Silica Carbide	Inhalable	10
	Respirable	4

APPENDIX 2 RELEVANT NATIONAL LEGISLATION AND GUIDANCE

AIR QUALITY STRATEGY OBJECTIVES IN AIR QUALITY REGULATIONS

1. UK ACTS OF PARLIAMENT

This section provides a summary of some of the legislation and guidance that local authorities can use to control dust and emissions from construction and demolition sites. These are provided for information purposes and are not an authoritative statement of the law.

ENVIRONMENTAL PROTECTION ACT (EPA) 1990 AND POLLUTION PREVENTION AND CONTROL (ENGLAND AND WALES) REGULATIONS 2007

Part 1 of the EPA 1990 contains two methods of pollution control, Part A and Part B (below)

- c Integrated Pollution Control (IPC) – regulation of the larger polluting processes (Part A) by the Environment Agency
- d Local Authority Integrated Pollution Prevention and Control (LA-IPPC) - local authority regulation of industrial activities (Part A2), covers emissions to air, water (including discharge to sewers) and land
- e Local Air Authority Pollution and Prevention Control (LAPPC) – regulation of smaller, less polluting processes (Part B) by the local authority
- f From 1 August 2000, regulation of processes has been transferred to the Pollution Prevention and Control (England and Wales) Regulations 2000. These regulations were amended in 2007. Certain activities relevant to construction sites are regulated as Part

- B processes and have their own process guidance (PG) and/or additional guidance notes, including:
- Mobile Crushing and Screening Processes- PG 3/16 (04)
 - Quarry Processes (Aggregates)- PG 3/8 (04)
 - Blending, Packing, Loading and use of Bulk Cement- PG 3/1 (11) – revised draft 2004
 - Asbestos- PG 3/13 (95) with additional guidance AQ15(04))
 - Plaster Processes- PG 3/12 (04)
 - Lime Processes – PG 3/14 (04)
 - Cement Processes - AQ14 (92)
 - Mobile Plant AQ 9(92)

Part II makes provisions for the management of waste duty of care for its proper disposal, for example Part 2 33(c) states that a person shall not treat, keep or dispose of controlled waste in a manner likely to cause pollution of the environment or harm to human health. Part III of the Act allows local authorities to take action to abate statutory nuisances such as dust, steam, smell, fumes from construction site that is deemed prejudicial to health or a nuisance. Dark smoke emissions are dealt with separately under the Clean Air Act 1993.

GREATER LONDON AUTHORITY ACT 1999 (AS AMENDED)

This Act set up the Greater London Authority and functional bodies (Transport for London, Metropolitan Police Authority, London Fire and Emergency Planning Authority and the London Development Agency). It is made up of a directly elected Mayor and a separately elected Assembly.

The Mayor has an executive role, making decisions on behalf of the GLA and must have regard to equality of opportunity, promoting health and sustainable development. The Mayor has published his statutory strategies on transport, spatial development, economic development and the environment. They contain policies to improve London's economy, infrastructure and environment and the most relevant to this Best Practice Guidance are the London Plan, Mayor's Transport Strategy and Mayor's Air Quality Strategy.

ENVIRONMENT ACT 1995 AND AIR QUALITY REGULATIONS 2010

The Air Quality Strategy set standards and objectives (see Appendix 1 for more details) for air pollutants under Part IV of the Environment Act 1995. Local authorities have a responsibility to carry out a process of Local Air Quality Management and work towards objectives set for seven pollutants in the Air Quality Regulations. Of these, the most relevant for construction sites is PM10, for which a short term (24 hour) and long term (annual average) objective have been set.

CLEAN AIR ACT 1993

Under the Clean Air Act 1993, the burning of infected timber and waste is exempt in cases where transportation may have cross- infected wooden backed vehicles. However, emitting dark smoke from bonfires is an offence under this act.

BUILDING ACT 1984

Applies to demolition of buildings and requires prior notification to the local authority and production of a method

statement before work begins. Sections 80-82 concern procedures to be carried out by the person who intends to undertake demolition. Under Section 80, the developer must notify Building Control at least 6 weeks before work begins. Demolition may commence after 6 weeks has elapsed from the submission of the notification or after the local authority has issued a counter notice, which will require certain tasks to be carried out. The local authority will often issue a counter notice that requires certain tasks to be carried out first.

HEALTH AND SAFETY AT WORK ACT 1974

The purpose of this act is to secure the health, safety and welfare of person at work and to protect against risk to other persons from these activities. Under this act the Health and Safety Executive (HSE) issue sets of guidance notes, the most relevant to construction activities include:

- Working with asbestos cement and board- HSG189/1, HSG 189/2.
- Dust: general principles of protection- EH44.
- Respirable crystalline silica-EH59.
- Man-made mineral fibres-EH46.
- Ventilation of the workplace-EH22.
- Assessment of exposure to fumes from welding and allied processes-EH54
- The control of exposure to fumes from welding, brazing and similar processes- EH55.
- Occupational Exposure Limits-EH40.
- Asbestos: exposure limits and measurements of airborne dust concentrations -EH10.
- Asbestos 1988-HS13.
- BS 6187:1982 Code of Practice for Demolition.

2. NATIONAL REGULATIONS

The following regulations and guidance are also important to consider when dealing with dust and emissions from construction sites:

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS (COSHH) 2002

These regulations apply to all “very toxic, toxic, harmful, corrosive or irritant” substances. This includes dust of any kind when present in the air. These regulations mean employers must protect their employees. This includes a requirement to comply with exposure limits in the HSE publication EH40, which is published annually⁵ (see Table 1 and 2 that relate to materials from construction).

CONTROL OF ASBESTOS REGULATIONS 2012

The control limit for asbestos is 0.1 asbestos fibres per cubic centimetre of air (0.1 f/cm³). The control limit is not a 'safe' level and exposure from work activities involving asbestos must be reduced to as far below the control limit as possible.

THE CONTROL OF POLLUTION (SPECIAL WASTE) REGULATIONS 1980 (AMENDED 1988)

These regulations define a system to trace special or special waste from the point of origin to final disposal, including transfer, subdivision, and any other change.

CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2007

These regulations are relevant to all stages and activities of construction and

demolition work as they aim to improve the management and co-ordination of all health, safety and welfare aspects throughout construction projects to reduce the number of accidents.

WASTE MANAGEMENT LICENSING REGULATIONS (WMLR) 1994. SCHEDULE 3 AND SPECIAL WASTE REGULATIONS 1996.

Procedures to manage contaminated and un-contaminated waste and deal with waste licenses.

THE NON-ROAD MOBILE MACHINERY (EMISSIONS OF GASEOUS AND PARTICULATE POLLUTANTS) (AMENDMENT) REGULATIONS 2011

Transposes stringent requirements to reduce emissions from diesel engines of non-road mobile machinery in EU directives 97/68/EC, 2002/99/EC and 2004/26/EC. These regulations tighten the emission standards in two stages – Stage IIIA from 2006–8 and Stage IIIB from 2011–12 to reduce NOX, hydrocarbons (HCs) and particulate emissions.

THE TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (ENGLAND AND WALES) REGULATIONS 2011

For major developments over certain thresholds (Schedule I and II applications), the developer must submit an environmental impact assessment (EIA) to the local authority before planning consent is granted. The EIA sets out the likely impacts on the environment of the proposed development (from all stages including demolition and construction)

and must include measures to mitigate any significant negative effects.

3. NATIONAL GUIDANCE

NATIONAL PLANNING POLICY FRAMEWORK

The NPPF states that planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.

NSCA GUIDANCE 20064: DEVELOPMENT CONTROL: PLANNING FOR AIR QUALITY

This new guidance provides a framework for air quality considerations to be included in the development control process and provides a new approach to addressing air quality impacts. The document aims to improve communication between developers, planners and environmental health officers.

LONDON COUNCIL'S GUIDANCE

This guidance provides robust technical advice for developers (their consultants) and local authority air quality officers, on how to assess planning applications that could have an impact on air quality. The procedures aim to provide a consistent approach for dealing with air quality and planning in London.

4. ENVIRONMENT AGENCY GUIDANCE

MODEL PROCEDURES FOR THE MANAGEMENT OF LAND CONTAMINATION (CLR 11)

The Environment Agency developed the model to provide the technical framework for applying a risk management process when dealing with land affected by contamination. The process involves identifying, making decisions on, and taking appropriate action to deal with land contamination in a way that is consistent with government policies and legislation within the UK.

POLLUTION PREVENTION GUIDANCE NOTES (PPGS)

The Environment Agency, Scottish Environment Protection Agency (SEPA) and the Environment and Heritage Service in Northern Ireland have produced a range of Pollution Prevention Guidance notes (PPGs), which are targeted at a particular industrial sector or activity and gives advice on the law and good environmental practice. They include advice on oil and fuel storage, preventing pollution of water courses and managing fire water and major spillages.

These PPGs are available from either of the agencies as hard copies or directly from their websites.

Pollution Prevention Guidelines 1: General Guide to the Prevention of Pollution.

Pollution Prevention Guidelines 6: Working at Construction and Demolition Sites.

Pollution Prevention Guidelines 5: Works in, near or liable to affect watercourses.

APPENDIX 3 RELEVANT LONDON PLAN POLICIES

POLICY 1.1 DELIVERING THE STRATEGIC VISION AND OBJECTIVES FOR LONDON

STRATEGIC

A Growth and change in London will be managed in order to realise the Mayor's vision for London's sustainable development to 2031 set out in paragraph 1.49 and his commitment to ensuring all Londoners enjoy a good, and improving quality of life sustainable over the life of this Plan and into the future.

B Growth will be supported and managed across all parts of London to ensure it takes place within the current boundaries of Greater London without:

- a encroaching on the Green Belt, or on London's protected open spaces
- b having unacceptable Impacts on the environment

The development of east London will be a particular priority to address existing need for development, regeneration and promotion of social and economic convergence with other parts of London and as the location of the largest opportunities for new homes and jobs.

C Other mayoral plans and strategies, decisions on development proposals and investment priorities, and borough DPDs and development decisions should aim to realise the objectives set out in paragraph 1.50 so that London should be:

- a city that meets the challenges of economic and population growth

- b an internationally competitive and successful city
- c a city of diverse, strong, secure and accessible neighbourhoods
- d a city that delights the senses
- e a city that becomes a world leader in improving the environment
- f a city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities.

POLICY 3.2 IMPROVING HEALTH AND ADDRESSING HEALTH INEQUALITIES STRATEGIC

- A The Mayor will take account of the potential impact of development proposals on health and health inequalities within London. The Mayor will work in partnership with the NHS in London, boroughs and the voluntary and community sector as appropriate to reduce health inequalities and improve the health of all Londoners, supporting the spatial implications of the Mayor's Health Inequalities Strategy.
- B The Mayor will promote London as a healthy place for all – from homes to neighbourhoods and across the city as a whole – by:
- a coordinating investment in physical improvements in areas of London that are deprived, physically run-down, and not conducive to good health
 - b coordinating planning and action on the environment, climate change and public health to maximise benefits and engage a wider range of partners in action
 - c promoting a strong and diverse economy providing opportunities for all.
- C The impacts of major development proposals on the health and wellbeing of communities should be considered through the use of Health Impact Assessments (HIA).

PLANNING DECISIONS

- D New developments should be designed, constructed and managed in ways that improve health and promote healthy

lifestyles to help to reduce health inequalities.

LDF PREPARATION

- E Boroughs should:
- a work with key partners to identify and address significant health issues facing their area and monitor policies and interventions for their impact on reducing health inequalities
 - b promote the effective management of places that are safe, accessible and encourage social cohesion
 - c integrate planning, transport, housing, environmental and health policies to promote the health and wellbeing of communities
 - d ensure that the health inequalities impact of development is taken into account in light of the Mayor's Best Practice Guidance on Health issues in Planning.

POLICY 5.3 SUSTAINABLE DESIGN AND CONSTRUCTION

STRATEGIC

A The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.

PLANNING DECISIONS

B Development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process.

C Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:

- a minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems)
- b avoiding internal overheating and contributing to the urban heat island effect
- c efficient use of natural resources (including water), including making the most of natural systems both within and around buildings
- d minimising pollution (including noise, air and urban runoff)

- e minimising the generation of waste and maximising reuse or recycling
- f avoiding impacts from natural hazards (including flooding)
- g ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions
- h securing sustainable procurement of materials, using local supplies where feasible, and
- i promoting and protecting biodiversity and green infrastructure.

LDF PREPARATION

D Within LDFs boroughs should consider the need to develop more detailed policies and proposals based on the sustainable design principles outlined above and those which are outlined in the Mayor's supplementary planning guidance that are specific to their local circumstances.

APPENDIX 4 EXAMPLE CONDITIONS AND S106 CLAUSES

The following standard phrases are taken from legal agreements and section 106 agreements signed by London local planning authorities. These phrases are intended to show what conditions can be placed on developers, but it is by no means an exhaustive list. If you choose to use these examples, take care to ensure the correct wording is used to reflect current policies:

PROVISIONS FROM THE LEGAL AGREEMENT THAT APPLY TO THE THAMES GATEWAY BRIDGE

The legal agreement was signed by LB Barking and Dagenham, LB Greenwich, LB Newham, LB Redbridge and Transport for London. The following minimum provisions shall apply to vehicles used by contractors for the purposes of construction of the Thames Gateway Bridge, currently anticipated to be from 2008 to 2012:

- i All HGVs shall have minimum emissions standards equivalent to Euro III plus exhaust after treatment (duty cycle permitting) from start of construction and Euro IV by 2010;
- ii All Non Road Mobile Machinery (NRMM) shall use ultra low sulphur diesel (ULSD);
- iii All Non Road Mobile Machinery (NRMM) shall comply with either the current or next previous EU Directive Staged Emission Standards (97/68/EC, 2002/88/EC, 2004/26/EC);
- iv All Non Road Mobile Machinery (NRMM) shall be fitted with Diesel Particulate Filters (DPF) or other exhaust after-treatment

conforming to a defined and demonstrated filtration efficiency (load/duty cycle permitting); and

- v The ongoing conformity of plant retrofitted with exhaust after-treatment, to a defined performance standard, shall be ensured through a programme of on-site checks.

EXAMPLE OF A PLANNING CONDITION SET BY LB NEWHAM FOR THE CHANNEL TUNNEL RAIL LINK

All commercial road vehicles used on the construction project must meet the European Emission Standards (commonly known as Euro standards) of Euro 3 during any works that take place from the date of this consent and Euro 4 for any works that takes place from 1 January 2008. In the event of any new European Emission Standards being introduced after 2006, the standards shall be applied to all road vehicles serving the construction project within a period of 2 years from the date of introduction contained within the relevant EU Directive.

All non-road mobile vehicles with compression ignition engines used within the site must comply with emission standards set in EC directive 97/68/EC. Vehicles must meet Stage II limits from the start of contract and from 1 January 2012, meet Stage IIIa and b emission limits.

Exemptions to the above standards (for road and non-road vehicles) may be granted for specialist equipment or for equipment with alternative emission reduction equipment or run on alternative fuels. Such exemptions will be applied

for in writing to the LPA in advance of the use of such vehicles, detailing the reasons for the exemption being sought and clearly identifying the subject vehicles. Exemptions that are granted will be made in writing and such vehicles must not be used until written exemption has been received by the applicant.

No vehicles or plant to which the above emission standards apply shall be on site, at any time, whether in use or not, unless it complies with the above standards, without the prior written consent of the local planning authority.

Any diesel powered machines used on, or otherwise serving the site, must be run on ultra low sulphur diesel (also known as ULSD 'cleaner diesel' or 'green diesel'). "Ultra low sulphur diesel" means fuel meeting the specification within EN590:2004.

Reasons: To protect the amenity of future occupants and/or neighbours and with regard to policy EQ45 of the London Borough of Newham Unitary Development Plan (adopted June 2001).

EXAMPLES OF 106 AGREEMENT CLAUSES SET BY LB GREENWICH WITH REGARD TO THE GREENWICH PENINSULA DEVELOPMENT (PLANNING REF: 02/2903/O)

DEED OF PLANNING OBLIGATION

18. Low Emission Zone

18.1 The Developer covenants with the Council:

18.1.1 at the same time as it submits

the first application for residential/commercial development for approval of reserved matters to the Council in consultation with the GLA under condition number 53 of the Planning Permission to submit to the Council for approval details of the Low Emission Zone on the Land and of the Low Emission Zone Controls together with a programme for implementation of the Low Emission Zone and the Low Emission Zone Controls all within the terms set out in Schedule 6;

18.1.2 to implement the Low Emission Zone and the Low Emission Zone Controls on the respective parts of the Land in accordance with the details and the programme approved under Clause 18.1.1 to the reasonable satisfaction of the Council and thereafter keep implemented the Low Emission Zone and the Low Emission Zone Controls at all times until Completion of the Development to the reasonable satisfaction of the Council, subject to any variation of the Low Emission Zone and/or the Low Emission Zone Controls approved by the Council from time to time;

18.1.3 save for the heavy goods vehicles and construction vehicles referred to in Schedule 6 not later than 1 April 2010 (or such other date agreed by the Council) and thereafter at the dates for Periodic Review, to submit to the Council for approval a review of the operation of the Low Emission Zone, including the Low Emission Zone Controls over the preceding period and proposals for the following period and shall use all reasonable endeavours to obtain the Council's approval thereto.

The relevant schedule with regards to HGVs and the Greenwich Low Emission

Zone

12. Heavy Goods Vehicles /
Construction Vehicles

12.1 Through the operation of the Integrated Management System, MDL will use reasonable endeavours to achieve emission levels for HGV/Construction vehicles in accordance with the item 11.2 below.

12.2 MDL will use reasonable endeavours to achieve emission levels for HGV as follows:

12.3 80% vehicles achieving a minimum Euro 2 plus reduced pollution certificate up to 1 January 2007;

12.4 MDL will use the following measures:

(a) prior to MDL's approval of a principal Contractor to start on site at any of the development plots (and/or infrastructure works), the principal Contractor will be required to submit his strategy to MDL for achieving the required Euro emission standards;

(b) the principal Contractor will be required to monitor progress against his strategy referred to in Paragraph 3.1;

MDL will carry out a review of the HGV/Construction vehicle low emission zone measures and targets post Dome Arena opening with a view to achieving Euro 4 compliance by 1 January 2010.

DEED OF PLANNING OBLIGATION

35 Maximise use of the river Thames

35.1 The Developer covenants with the Council:

35.1.1 not later than the First Dwelling Implementation Date to submit to the Council for approval in consultation with TfL a strategy to maximise use of the River Thames where reasonably appropriate for the delivery of those construction materials to the Southern Land and removal of that construction waste from the Southern Land as listed in Schedule 3, during the construction of the Development;

35.1.2 before Implementation of any part of the Development on a Plot to submit to the Council for approval by the Council detailed measures to implement the strategy referred to in Clause 35.1.1 and to implement such measures in the carrying out of the part of the Development on the Plot.

35.2 The strategy shall be included in the Integrated Management System.

35.3 This Clause 35 is a Management Covenant except in relation to Clause 35.1.2 which is a Plot Covenant. similar facilities subject to the agreement of commercial terms. compliance by 1 January 2010.

The relevant schedule with regards to using the River Thames

RIVER USE/NON-ROAD USE

Any reference to MDL in this Schedule 2 shall, unless the context otherwise provides, mean the Developer in Clause 3 of this Agreement. Any reference to AnSCO in this Schedule 2 shall, unless the context otherwise provides, mean the Developer in

Clause 4 of this Agreement.

1. Through the operation of the Integrated Management System, the Developer will use reasonable endeavours to reduce road based construction traffic from levels predicted in the Environmental Statement. Maximising use of the River Thames will play a key role in achieving this objective but the Developer shall be entitled to have regard to the cost differential between river and road use.

2. The Developer will use reasonable endeavours to reduce the amount of construction materials transported by road to/from the Land (measured by weight and as a percentage of the total weight of materials transported) as follows:

2.1 10% by the first Periodic Review (2 years);

2.2 15% by the second Periodic Review (5 years);

2.3 20% by the third Periodic Review (10 years);

2.4 25% by the fourth Periodic Review (15 years); and

2.5 30% by the fifth Periodic Review (20 years).

3. The Developer will use the following measures:

3.1 Prior to the Developer's approval of a principal Contractor to start on site at any of the Plots (and/or associated infrastructure works), the principal Contractor will be required to submit its strategy to the Developer for

evaluation and implementation of non-road transportation of materials to/from its site. The principal Contractor's strategy shall include procedures for increasing the amount of non-road transportation of construction materials to/from his site during his contract period.

3.2 The principal Contractor will be required to monitor progress against the principal Contractor's strategy referred to in Paragraph 3.1. For example, at the Dates for Periodic Review referred to in Paragraph 2, the principal Contractor will be required by the Developer to confirm the proportion of materials (measured by weight and as a percentage of the total weight of materials) transported (or intended to be transported) to/from the Land by river transport.

4. Details of the Hanson concrete supply operation at VDWT and the London Concrete supply operation will be provided to all relevant Contractors by the Developer. Both operations utilise non-road transportation to import bulk aggregate materials to their facilities - and will qualify for designation as non-road imported material. All relevant Contractors will be encouraged by the Developer to utilise these or similar facilities subject to the agreement of commercial terms. compliance by 1 January 2010.

EXAMPLE PLANNING CONDITION FOR CLEANER ROAD MOBILE MACHINERY (2015 – 2019)

PLANNING CONDITION FOR GREATER LONDON (EXCLUDING THE CENTRAL

ACTIVITY ZONE AND CANARY WHARF)

All Non-Road Mobile Machinery (NRMM) used for major developments of net power between 37kW and 560 kW will be required to meet Stage IIIA of EU Directive 97/68/EC for both NO_x and PM. If Stage IIIA equipment is not available the requirement may be met using the following techniques:

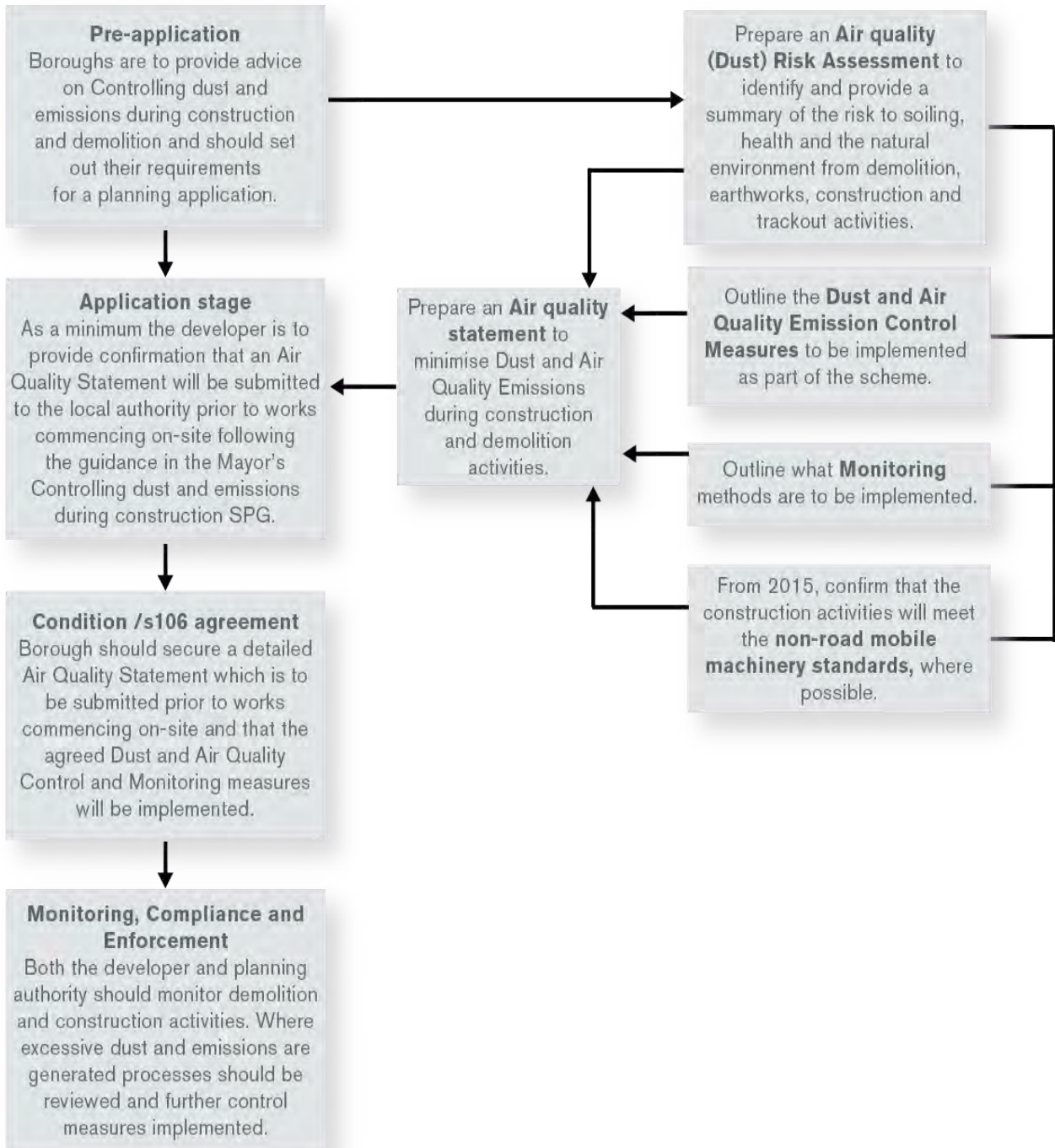
- Reorganisation of NRMM fleet
- Replacing equipment (with new or second hand equipment which meets the policy)
- Retrofit abatement technologies
- Re-engining

All eligible NRMM should meet the policy above unless it can be demonstrated that the machinery is not available or that a comprehensive retrofit for both PM and NO_x is not feasible. In this situation every effort should be made to use the least polluting equipment available including retrofitting technologies to reduce particulate emissions.

Developers will be required to provide a written statement of their commitment and ability to meet the policy within their Construction and Demolition Air Quality Statement and Environment Management plans.

An inventory of all NRMM must be kept on site and all machinery should be regularly serviced and service logs kept on site for inspection. Records should be kept on site which details proof of emission limits for all equipment. This documentation should be made available to local authority officers as required.

DUST AND EMISSIONS CONTROL FLOW CHART THROUGH THE PLANNING PROCESS



APPENDIX 5 LOCAL AUTHORITY POLLUTION PREVENTION AND CONTROL

The tables below outline relevant best available techniques in accordance with DEFRA's Process Guidance Notes.

MOBILE CRUSHING PLANT

SOURCES OF DUST	CONTROL TECHNIQUE
Loading and unloading of materials	Containment Suppression Reduce drop heights (through variable height conveyors)
Double handling transfer points	Site and process design
Stockpiles	Wind design management through fencing, bunding etc Suppression Covering
Crushing, grinding, screening	Containment Suppression Dust
Conveyors and transfer	Containment (wind boards) Appro
Blending and packing	Containment Reduce drop height Dust arrestment
External operations	Appropriate siting Wind design management
Vehicles	Wheel and under body washing

Taken from Defra Process Guidance Note 3/16 (04)

CEMENT CONCRETE BATCHING ACTIVITIES

SOURCES OF DUST	CONTROL TECHNIQUE
Loading and unloading of materials	Containment Suppression Reduce drop heights (through variable height conveyors conveyors or chutes) Dust arrestment (loading area) using bag or cartridge filters
Double handling transfer points	Site and process design
Delivery from road tanker to silo	Various techniques
Silos	Dust arrestment (bag or cartridge filters)
Aggregate stockpiles	Wind design management through fencing, bunding etc Suppression (water and/or suppressants, well positioned spray guns and sufficient coverage by sprays) Covering
Conveyors and transfer	Containment (wind boards) Reduce drop heights Appropriate siting away from receptors
Blending and packing	Containment Designated areas Reduce drop height Dust arrestment (bag or cartridge filters)
External operations	Appropriate siting Wind design management
Vehicles	Wheel and under body washing Exhausts that do not point vertically down

Taken from DEFRA Process Guidance Note 3/1 (04)

APPENDIX 6 DEVELOPMENTS REFERABLE TO THE MAYOR

In accordance with the Mayor of London Order 2008 local authorities in Greater London must refer to the Mayor any planning applications received on or after 6th April 2008 which meet one or more of the following criteria.¹

APPLICATION	CRITERIA
New Housing	Any development comprising or including over 150 units (houses or flats) Departure involving provision of residential units adjacent to waste site
Other New Uses (e.g. retail, industry, offices)	100,000 sq.m. in the City 20,000 sq.m. in the rest of central London 15,000 sq.m. outside of central London
(e.g. retail, industry, offices)	Various techniques
New Tall Buildings	25m adjacent to the River Thames 150m anywhere else in the City 30m elsewhere
Existing Tall Buildings	Increase of 15m, if then above the relevant threshold for new tall buildings
Mining	10 ha (winning and working of minerals in, on or under the ground)
Waste	Capacity more than 5,000 tonnes per annum of hazardous waste Capacity more than 50,000 tonnes per annum of other waste Waste development occupying more than one hectare / 10,000 sq.m Departure involving 5 ha / 5,000 sq.m Departure involving 2,000t (hazardous waste) or 20,000t (other waste)

APPLICATION	CRITERIA
Transport	<p>Aircraft runway, Air passenger terminal at an airport or Heliport Existing air passenger terminal capacity increase of 500,000 passenger p.a. Railway station; Tramway; underground, surface or elevated railway; cable car Bus or coach station Storage or distribution (B8) occupying more than 4 ha River Thames crossing (over or under) Thames passenger pier Depot to store more than 70 buses/coaches or occupies more than 0.7 ha Departure involving loss of bus/coach depot as above</p>
Existing housing ²	<p>Any development involving the loss of 200 units (houses or flats) (irrespective of any new units) or loss of 4 ha of land used for housing</p>
Existing B1 Business, B2 General Industrial, B8 Storage or Distribution ²	<p>Any development involving the loss of 4 ha</p>
Playing Fields ²	<p>Any development involving the loss of 2 ha</p>
Green Belt/MOL	<p>One or more buildings totalling 1,000 sq.m or more - new use or change of use</p>
Departures from the relevant UDP/LDF/Local Plan	<p>2,500 sq.m. of retail (A1), financial and professional (A2), food and drink (A3), drinking establishments (A4), hot food takeaways (A5), business (B1), general industrial (B2), storage and distribution (B8), hotels (C1), residential institutions (C2), non-residential institutions (D1), assembly and leisure (D2)</p>
Parking	<p>200 spaces (non-residential)</p>
Article 10(3) direction	<p>Any development subject to such a direction, or any development on a site subject to such a direction. (This includes safeguarded wharves and developments in a safeguarded strategic view; in the near future this will also include the safeguarded alignments for the East Thames river crossings)</p>

2006 REVIEW OF THE MAYOR'S POWERS

After wide consultation the Government has decided to grant increased powers to the Mayor on a number of key areas, including planning. The legislation granting these powers is expected to receive Royal Assent in summer 2007 and will enable the Mayor to:

- Direct changes to boroughs' programmes for the local development plans they produce.
 - Have a stronger say on whether draft local development plans are in general conformity to his London Plan.
 - Use his discretion to determine planning applications of strategic importance.
-

APPENDIX 7 AIR QUALITY CONTROL

MEASURES RELEVANT FOR DEMOLITION, EARTHWORKS, CONSTRUCTION AND TRACK-OUT

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
Site management			
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.		XX	XX
Develop a Dust Management Plan.		XX	XX
Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary.	XX	XX	XX
Display the head or regional office contact information.	XX	XX	XX
Record and respond to all dust and air quality pollutant emissions complaints.	XX	XX	XX
Make a complaints log available to the local authority when asked.	XX	XX	XX
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.	XX	XX	XX
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.	XX	XX	XX
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.	XX	XX	XX

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
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.			XX
Preparing and maintaining the site			
Plan site layout: machinery and dust causing activities should be located away from receptors.	XX	XX	XX
Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site.	XX	XX	XX
Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	X	XX	XX
Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution.		X	X
Avoid site runoff of water or mud.	XX	XX	XX
Keep site fencing, barriers and scaffolding clean using wet methods.	X	XX	XX
Remove materials from site as soon as possible.	X	XX	XX
Cover, seed or fence stockpiles to prevent wind whipping.		XX	XX
Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary.		X	XX
Provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust.			X
Agree monitoring locations with the Local Authority.		XX	XX
Where possible, commence baseline monitoring at least three months before phase begins.		XX	XX

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.		XX	XX
Operating vehicle/machinery and sustainable travel			
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone.	XX	XX	XX
Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance.	XX	XX	XX
Ensure all vehicles switch off engines when stationary – no idling vehicles.	XX	XX	XX
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible.	XX	XX	XX
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).	X	X	XX
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.		XX	XX
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	XX	XX	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	XX	XX

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible).	XX	XX	XX
Use enclosed chutes, conveyors and covered skips.	XX	XX	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	XX	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	XX
Waste management			
Reuse and recycle waste to reduce dust from waste materials	XX	XX	XX
Avoid bonfires and burning of waste materials.	XX	XX	XX

MEASURES SPECIFIC TO DEMOLITION

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	X	X	XX
Ensure water suppression is used during demolition operations.	XX	XX	XX
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	XX	XX	XX
Bag and remove any biological debris or damp down such material before demolition.	XX	XX	XX

MEASURES SPECIFIC TO EARTHWORKS

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

MEASURES SPECIFIC TO CONSTRUCTION

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
Avoid scabbling (roughening of concrete surfaces) if possible	X	X	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	X	XX	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.		X	XX
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.		X	X

MEASURES SPECIFIC TO TRACKOUT

MITIGATION MEASURE	LOW RISK	MEDIUM RISK	HIGH RISK
Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site.	X	XX	XX
Avoid dry sweeping of large areas.	X	XX	XX
Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport.	X	XX	XX
Record all inspections of haul routes and any subsequent action in a site log book.		XX	XX
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned.		XX	XX
Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;		XX	XX
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	X	XX	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	XX
Access gates to be located at least 10m from receptors where possible.		XX	XX
Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site		X	XX

XX Highly Recommended

X Desirable

APPENDIX 8 AIR QUALITY MONITORING TECHNIQUES

There are a wide range of sampling and detection methods available. Some of the main techniques are indicated below:

1. Automatic real-time point analyser methods

Provide high-resolution measurements (typically hourly or shorter time periods). In order to ensure that data is accurate and reliable, there needs to be a high standard of maintenance, calibration and QA/QC procedures in place. These types of monitors can measure different particulate fractions such as PM10 and PM2.5 when fitted with designated inlet heads. Monitors such as TEOM or beta-attenuation analysers (with heated inlets) need to be corrected by a factor of 1.3, when comparing results with the AQS objectives, as these are based on a gravimetric standard.

2. Gravimetric monitoring

This monitoring method is considered to be the most accurate and produces concentrations equivalent to the EU reference samplers, which are used to set EU limit values. Such systems have designated inlet heads to measure different particulate fractions and a typical measurement is taken over 24 hours. The measurement system is time-consuming as filters need to be individually weighed and accurate filter weighing and conditioning facilities are required. This method cannot be used as a trigger system as it does not produce instantaneous readings.

3. Remote optical/long path analysers

These are relatively low-cost automatic analysers that have been developed specifically for portable or personal exposure applications. These tend to be battery or mains powered and use the light scattering principle to measure PM10 and other particulate fractions.

4. Hand-held monitors

Although these types of monitors are not as accurate as automatic monitors and cannot be used for long term studies, they are ideal for walk-over surveys of construction sites as they provide real time or instantaneous dust readings (every second). These monitors can be set up to measure different particle sizes and can be used to assess short term peaks and breaches of set limits.

In techniques 3 and 4, a factor is used to convert the measured number of particles in each size range to an overall mass concentration – which may not be accurate without a gravimetric filter backup.

In addition to the individual monitors, other site infrastructure is often required, particularly to support automatic monitors and can include housing structures, cooling or heating systems, electrical systems, telephone lines or modems and air sample inlet systems.

Automatic monitoring equipment should have an independent verification of performance, such as the Environment Agency's MCERTS scheme. Further information on siting requirements and equipment suppliers is available on the National Air Quality Information Archive at

www.airquality.co.uk.

5. Dust assessment

Approaches to measure the amount of dust deposited on a surface tend to focus on either determining the soiling of a surface by a change in its properties or determining the quantity of dust deposited, by weight. These techniques are often used to determine nuisance and may be requested by a local authority in cases of complaint from sensitive receptors. Accepted methodologies include:

Deposit gauges: These are simple, but accurate methods to measure nuisance dust. Dust is collected onto a horizontally mounted capture container, or, in the case of a Directional Dust Gauge, into four vertical tubes aligned in different directions. The dust collected can also be analysed to determine its composition.

DEPOSITED DUST GUIDELINES FOR URBAN AREAS (BASED ON MONTHLY MEAN DUSTFALL)

TABLE 2. EXAMPLES OF DUST GUIDELINE LEVELS

BRITISH STANDARD GAUGE (MG/M ² /D)		DRY FRISBEE GAUGE EQUIV (MG/M ² /D)	
Complaints possible (90th percentile)	Complaints likely (95th percentile)	Complaints possible	Complaints likely
150	190	200	260

Soiling Rate Measurement: This is used to determine changes in the soiling rates of surface over a period of time. One method is the Sticky Pad system, which measures the soiling on a white adhesive surface over a known period. This provides a measurement of the deposition (as percentage Effective Area Coverage per day) using a reflectometer. Alternatively, glass slides can be used which are exposed for a week before returning to the laboratory to measure the changes in the gloss of the surface reflectance. Results are measured in soiling units (su) per week, whereby 20 su/week reflects a dusty activity.

Soiling rates

1) Sticky pads

Possible complaints: 0.5 per cent Effective Area Coverage (EAC)/day (34 g/m³). Serious complaints: 5 per cent EAC/day (280 g/m³)

2) Glass slides

A level of 20-25 su/week, averaged over 4 weeks appears to be the boundary between acceptable and unacceptable dust levels.

APPENDIX 9 SUMMARY GUIDANCE ON THE USE OF DUST SUPPRESSANTS

What's this document about?	<p>This document provides guidance on the use of dust suppressants.</p> <p>The main focus of this document is on waste transfer sites, but many of the abatement techniques could be successfully applied to other types of waste facilities or other potentially dusty activities, such as construction and demolition sites or road works.</p>
Who does this apply to?	<p>Waste site operators, construction/demolition site managers, utility companies and contractors undertaking road works and site personnel carrying out dust suppressant applications.</p>
What is in the document ?	<p>The document includes the following information:</p> <ul style="list-style-type: none"> • Guidance for Site Personnel; and • Guidance for Site Managers.
Guidance for Site Managers	
Site Manager Tasks	<p>The site manager will need to get the site organised to deploy dust suppressants including:</p> <ul style="list-style-type: none"> • Decide on and order a dust suppressant; • What equipment will be needed; • Who will be responsible for applications and equipment; • Identify a location to store the containers; • Decide how the containers are going to be accessed by the site operative; • How the dust suppressants are going to be applied by operatives; • How often will suppressants need to be applied; • How much suppressant to apply; • Using suppressants with other dust abatement measures; • How often will suppressants need to be ordered; and • Updating management systems with a standard operating procedure.

<p>Decide on a dust suppressant;</p>	<p>There are a range of dust suppressants available. The trials undertaken by TfL and the EA have utilised Ice and Dust Away 25 a Calcium Magnesium Acetate (CMA) solution from Nordisk Aluminate A/S.</p> <p>Costs for dust suppressants will vary between manufacturers and the location solutions are shipped from. However, an indicative price for 1,000 litres before shipping for one brand is a few hundred pounds.</p>
<p>What equipment will be needed</p>	<p>The equipment required will be determined by following manufacturer's instructions and through risk assessment (e.g. site specific risk assessment, COSHH etc). However, it is anticipated that the following type of equipment will be needed by site operatives:</p> <ul style="list-style-type: none"> • Personal Protective Equipment (PPE): e.g. safety glasses, gloves, high visibility vest etc; • A stirrer to make sure the suppressant solution is well mixed; • A basic hand held pump to extract the solution from the container; and • A backpack spray pack with volume measurements on the pack so the operator knows how much solution has been used (or other form of applicator e.g. bowser).
<p>Identify who will be responsible for day to day applications</p>	<p>Identifying a site operative who will be responsible for dust suppressant applications and cover members of staff will help make applications part of routine site operations.</p> <p>This operative and any additional site operatives who may be required to cover absences should receive appropriate training on-site considering manufacturer's instructions and the sites standard operating procedure (see the Standard Template at the end of this Appendix) and this guidance as necessary.</p>
<p>Identify a location to store the containers</p>	<p>Dust suppressants should be stored in a safe location away from vehicles. The manufacturer's instructions provided with the suppressants will advise on storage (e.g. whether bunds are required or not), but no refrigeration or locked containers etc are generally needed.</p>

<p>Decide how the containers are going to be accessed by the site operative</p>	<p>Transferring a portion of the dust suppressant solution from storage containers can be done using a small hand held pump from the top of some containers or some have a tap at the base of the container. Some operators have raised containers off the ground to make taps and container tops more accessible for site operatives.</p>
<p>How the dust suppressants are going to be applied</p>	<p>Dust suppressants may be applied using dedicated vehicles with tanks and a rotating disk (as used in the trial on the TfL road network), using road sweepers as on roads near waste sites, using bowsters with small pumps on a construction site or using backpacks, as used on some waste transfer sites. The application method for dust suppressants depends on a number of factors including: the dust sources to be treated, the area to be treated and the equipment available. For example small areas could easily be treated using backpacks, but a large yard site may require a method that allows greater areas to be treated more quickly, if compliant with manufacturer's instructions. This could include a bowster with a small pump or a road sweeper.</p>

<p>How much suppressant to use</p>	<p>The amount of liquid to be spread will depend on how high a delivery rate is required (e.g. in particularly dusty locations higher rates may be required to abate dust). More dusty locations and locations with higher vehicle movements may require higher amounts of liquid.</p> <p>Information may be provided in manufacturer’s instructions to enable delivery rates to be calculated. However, if not rates of coverage can be worked out by measuring how much liquid is used in a known area.</p> <p>Delivery rates can be calculated based on changes in volume at the start and end of spraying over a known area following the below formula:</p> <ul style="list-style-type: none"> • Volume used (litres (l)) divided by area (meters square (m²)) to calculate a delivery rate (l/m²). • This is converted in to a delivery rate of ml/m² by multiplying by 1000. • For Ice and Dust Away 25 the delivery rate in ml/m² can be converted in to a delivery rate in grams per m² by multiplying by 1. • This is calculated based on an approximate fluid density of 1:1 whereby 10ml is equivalent to 10g. <p>Some examples are listed below:</p> <ul style="list-style-type: none"> • When 5 litres of suppressant is applied over an area of 1,000m² this is a delivery rate of 5 millilitres (ml) per m² or a rate of coverage of 5 grams (g) per m². • When 10 litres of suppressant is applied over an area of 1,000m² this is a delivery rate of 10 millilitres (ml) per m² or a rate of coverage of 10 grams (g) per m². • When 10 litres of suppressant is applied over an area of 500m² this is a delivery rate of 20 millilitres (ml) per m² or a rate of coverage of 20 grams (g) per m². <p>These examples show that the greater the volume of suppressant applied in a given area, the higher the rate of suppressant delivery. The standard operating procedures for sites should note down how much suppressant and how long it should take to treat areas on-site. Initial tests could be done with water to establish how long different areas will take to treat.</p>
<p>Use with other dust abatement measures</p>	<p>After dust suppressants have been applied care should be taken not to wash away or dilute the layer of dust suppressants in cleaning operations, for example by using a bowser on a treated area as this would risk washing away the dust suppressants.</p>

<p>How often will suppressants need to be ordered</p>	<p>The amount of dust suppressant required by a site will vary depending on the areas to be treated, the frequency of applications and on the amount of liquid applied. However, using the example above ('How much suppressant to use' sub-section) a small treatment area of 1000 m² (0.1 ha) treated on a daily basis, using a spray of 10ml/m² (10g/m²), would last around 3 months and cost around £1,000 without shipping.</p>
<p>Updating management systems with a standard operating procedure</p>	<p>The management practices at the site will need to be updated to reflect the operating procedure for dust suppressant applications. A standard template is provided at the end of this Appendix.</p>
<p>Reporting and Feedback</p>	<p>As part of the application process records must be retained on-site detailing the applications of suppressants (e.g. site diaries).</p> <p>Record keeping is important as it enables site managers to evaluate the performance of suppressant applications against any monitoring data (either visual, ambient air quality monitoring or dust soiling/deposition data).</p> <p>This information can then be used to adjust programmes of applications to improve dust suppression, for example to increase the number of treatments, change the timing of treatments or the amounts of suppressant used.</p> <p>This information would also be useful to demonstrate how dust has been managed to third parties, such as the EA (waste sites) or Environmental Health Officers (construction sites) in the event of dust issues.</p> <p>Third parties, such as the EA, would also welcome feedback so that further practical knowledge on the application of dust suppressants can be disseminated to further improve dust management and to share knowledge with other site managers and operations.</p>

GUIDANCE FOR SITE PERSONNEL

STEP BY STEP GUIDANCE	THIS SECTION PROVIDES STEP BY STEP GUIDANCE FOR SITE OPERATIVES UNDERTAKING THE DUST SUPPRESSANT APPLICATIONS. FURTHER INFORMATION ON WHEN TO APPLY SUPPRESSANTS IS PROVIDED IN THE GUIDANCE FOR SITE MANAGERS SECTION
Step 1	Collect PPE e.g. gloves, safety glasses and equipment e.g. backpack sprayer or bowser.
Step 2	Check the areas to be treated and how much solution is to be used at each area from the standard operating procedure (e.g. Area A: 10 litres)
Step 3	Stir and transfer the amount of suppressant solution required in to the backpack sprayer or bowser for the area to be treated (e.g. 10 litres).
Step 4	Check the amount of time it should take to treat the area about to be treated (e.g. Area A: 20 minutes).
Step 5	Take equipment to the area to be treated.
Step 6	Note the time and start treatment by walking at a steady rate to complete the treatment in the time identified for the area being treated.
Step 7	Check as treatment is underway that the treatment is on target to be completed in the correct time (e.g. 10 minutes around a half of the area has been treated).
Step 8	Check the amount of solution used at the end of the treatment is correct, if not change the pace of treatment on the next application.
Step 9	Return the equipment ready for the next treatment.
Step 10	Note down the dates, time, weather and amount of solution used and time its taken for the application at the treatment areas.

BENEFITS AND LIMITATIONS OF DUST SUPPRESSANTS

<p>INTRODUCTION</p>	<p>DUST SUPPRESSANTS HAVE A RANGE OF BENEFITS WHICH CAN BE USEFUL AS PART OF A PACKAGE OF OTHER DUST ABATEMENT MEASURES. HOWEVER, THERE ARE SOME LIMITATIONS WHICH SHOULD BE CONSIDERED. THIS SECTION OUTLINES THE STRENGTHS AND LIMITATIONS OF DUST SUPPRESSANTS.</p>
<p>Benefits</p>	<p>The benefits of dust suppressants, integrated in to a package of dust abatement measures, are outlined below:</p> <p>Demonstrated effectiveness Demonstrated effectiveness in reducing dust re-suspension in locations with high dust levels, such as waste or construction sites.</p> <p>Low cost The use of dust suppressants is low cost in comparison to some dust suppression measures e.g. construction of enclosed facilities.</p> <p>Reduced water use Some operators have found that less water is required because dust suppressants have increased longevity relative to water suppression, to achieve the same levels of dust suppression.</p> <p>Easy to do The application of dusts suppressants is relatively straight forward and quick to do.</p> <p>Ice control Some dust suppressants have properties which assist in the control of ice formation, some are used at Airports for this purpose.</p>

<p>INTRODUCTION</p>	<p>DUST SUPPRESSANTS HAVE A RANGE OF BENEFITS WHICH CAN BE USEFUL AS PART OF A PACKAGE OF OTHER DUST ABATEMENT MEASURES. HOWEVER, THERE ARE SOME LIMITATIONS WHICH SHOULD BE CONSIDERED. THIS SECTION OUTLINES THE STRENGTHS AND LIMITATIONS OF DUST SUPPRESSANTS.</p>
<p>Limitations</p>	<p>The limitations of dust suppressants are outlined below:</p> <p>Some ongoing management and costs Whilst the application of dust suppressants is low cost and easy to do there are some on going costs associated with labour to prepare and apply solutions and also on going costs to purchase solutions and for fuel if bowsers are used to apply solutions.</p> <p>Interaction with sensitive materials In some circumstances, there may be adverse reactions between some dust suppressants and other materials. For example CMA, at certain concentrations may react with bentonite. Manufacturer’s recommendations should be followed to identify and avoid any potentially sensitive interactions.</p> <p>Skid resistance At higher rates of delivery, some dust suppressants may cause a reduction in skid resistance. Manufacturer’s recommendations should be followed to avoid applications at too high concentrations.</p>

STANDARD OPERATING PROCEDURE TEMPLATE

The table opposite presents the type of information that would be useful in a sites standard operating procedure. A site standard operating procedure should be developed based on manufacturers instructions, site specific risk assessment and specific site requirements (e.g. areas requiring treatment). The text in blue is an example.

DUST SUPPRESSANT INFORMATION	SITE DETAILS
Dust Suppressant Name	Ice and Dust Away 25
Risk Assessment Information	Risk Assessment kept in site offices – safety files.
Storage Location	By storage cabin (with or without bunding as recommended by manufacturer's instructions)
Key Site Operative responsible for dust suppressant applications	P Jones
Cover Site Operatives responsible for dust suppressant applications when key site operative is absent	S Smith
Safety Equipment	Safety glasses, gloves, high visibility clothing
Application Equipment	Backpack sprayer.
Treatment Areas	Skip storage area
Treatment Frequencies	Skip unloading area
Treatment Amounts	Entrance area
Treatment Durations	Start of day and end of day
Application Procedure	And in response to elevated monitoring
Treatment Amounts	Skip storage area 10 litres undiluted
Skip unloading area 12 litres undiluted	Skip unloading area 12 litres undiluted
Entrance area 15 litres undiluted	Entrance area 15 litres undiluted
Treatment Durations	Skip storage area 15 minutes
Skip unloading area 20 minutes	Skip unloading area 20 minutes
Entrance area 25 minutes	Entrance area 25 minutes
Application Procedure	Laminated copy of 'Guidance for Site Personnel' kept in site diary and in storage cabin

Other formats and languages

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Chinese

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Vietnamese

Nếu bạn muốn có văn bản tài liệu này bằng ngôn ngữ của mình, hãy liên hệ theo số điện thoại hoặc địa chỉ dưới đây.

Greek

Αν θέλετε να αποκτήσετε αντίγραφο του παρόντος εγγράφου στη δική σας γλώσσα, παρακαλείστε να επικοινωνήσετε τηλεφωνικά στον αριθμό αυτό ή ταχυδρομικά στην παρακάτω διεύθυνση.

Turkish

Bu belgenin kendi dilinizde hazırlanmış bir nüshasını edinmek için, lütfen aşağıdaki telefon numarasını arayınız veya adrese başvurunuz.

Punjabi

ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫੋਨ ਕਰੋ ਜਾਂ ਹੇਠ ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਖਤਾ ਕਰੋ:

Hindi

यदि आप इस दस्तावेज की प्रति अपनी भाषा में चाहते हैं, तो कृपया निम्नलिखित नंबर पर फोन करें अथवा नीचे दिये गये पते पर संपर्क करें

Bengali

আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি (কপি) চান, তা হলে নীচের ফোন নম্বরে বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

Urdu

اگر آپ اس دستاویز کی نقل اپنی زبان میں چاہتے ہیں، تو براہ کرم نیچے دئے گئے نمبر پر فون کریں یا دیئے گئے پتے پر رابطہ کریں

Arabic

إذا أردت نسخة من هذه الوثيقة بلغتك، يرجى الاتصال برقم الهاتف أو مراسلة العنوان أدناه

Gujarati

જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.

MAYOR OF LONDON