

## Appendix 11.1: Detailed Construction Dust Assessment Methodology

### Source

- 1.1 The IAQM dust guidance gives examples of the dust emission magnitudes for demolition, earthworks and construction activities and trackout. These example dust emission magnitudes are based on the site area, building volume, number of HDV movements generated by the activities and the materials used. These example magnitudes have been combined with details of the period of construction activities to provide the ranking for the source magnitude that is set out in Table 11.1.1.

**Table 11.1.1 Risk Allocation – Source (Dust Emission Magnitude)**

| Features of the Source of Dust Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Dust Emission Magnitude |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <p><b>Demolition</b> - building over 50,000 m<sup>3</sup>, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities &gt; 20 m above ground level.</p> <p><b>Earthworks</b> – total site area over 10,000 m<sup>2</sup>, potentially dusty soil type (e.g. clay), &gt;10 heavy earth moving vehicles active at any one time, formation of bunds &gt; 8 m in height, total material moved &gt; 100,000 tonnes.</p> <p><b>Construction</b> - total building volume over 100,000 m<sup>3</sup>, activities include piling, on-site concrete batching, sand blasting. Period of activities more than two years.</p> <p><b>Trackout</b> – 50 HDV outwards movements in any one day, potentially dusty surface material (e.g. High clay content), unpaved road length &gt; 100 m.</p>                                                                                                                 | Large                   |
| <p><b>Demolition</b> - building between 20,000 to 50,000 m<sup>3</sup>, potentially dusty construction material and demolition activities 10 - 20 m above ground level.</p> <p><b>Earthworks</b> – total site area between 2,500 to 10,000 m<sup>2</sup>, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 - 8 m in height, total material moved 20,000 to 100,000 tonnes.</p> <p><b>Construction</b> - total building volume between 25,000 and 100,000 m<sup>3</sup>, use of construction materials with high potential for dust release (e.g. concrete), activities include piling, on-site concrete batching. Period of construction activities between one and two years.</p> <p><b>Trackout</b> – 10 - 50 HDV outwards movements in any one day, moderately dusty surface material (e.g. High clay content), unpaved road length 50 – 100 m.</p>                        | Medium                  |
| <p><b>Demolition</b> - building less than 20,000 m<sup>3</sup>, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities &lt; 10 m above ground, demolition during winter months.</p> <p><b>Earthworks</b> – total site area less than 2,500 m<sup>2</sup>. Soil type with large grain size (e.g. sand), &lt; 5 heavy earth moving vehicles active at any one time, formation of bunds &lt; 4 m in height, total material moved &lt; 10,000 tonnes earthworks during winter months.</p> <p><b>Construction</b> - total building volume below 25,000 m<sup>3</sup>, use of construction materials with low potential for dust release (e.g. metal cladding or timber). Period of construction activities less than one year.</p> <p><b>Trackout</b> – &lt; 10 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length &lt; 50 m.</p> | Small                   |

## Pathway and Receptor - Sensitivity of the Area

- 1.2 Pathway means the route by which dust and particulate matter may be carried from the source to a receptor. The main factor affecting the pathway effectiveness is the distance from the receptor to the source. The orientation of the receptors to the source compared to the prevailing wind direction is a relevant risk factor for long-duration construction projects; however, short-term construction projects may be limited to a few months when the most frequent wind direction might be quite different, so adverse effects can potentially occur in any direction from the site.
- 1.3 As set out in the IAQM dust guidance, a number of attempts have been made to categorise receptors into high, medium and low sensitivity categories; however, there is no unified sensitivity classification scheme that covers the quite different potential effects on property, human health and ecological receptors.
- 1.4 Table 11.1.2 and Table 11.1.3 outline the IAQM basis for categorising the sensitivity of people and property to dust and PM<sub>10</sub> respectively.

**Table 11.1.2 Sensitivities of People and Property Receptors to Dust**

| Receptor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sensitivity |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Principles:-</b> <ul style="list-style-type: none"> <li>• Users can reasonably expect enjoyment of a high level of amenity; or</li> <li>• 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.</li> </ul> <b>Indicative Examples:-</b> <ul style="list-style-type: none"> <li>• Dwellings.</li> <li>• Museums and other culturally important collections.</li> <li>• Medium and long-term car parks and car showrooms.</li> </ul>                                                   | High        |
| <b>Principles:-</b> <ul style="list-style-type: none"> <li>• 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</li> <li>• the appearance, aesthetics or value of their property could be diminished by soiling; or</li> <li>• the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.</li> </ul> <b>Indicative Examples:-</b> <ul style="list-style-type: none"> <li>• Parks.</li> <li>• Places of work.</li> </ul>                                                                  | Medium      |
| <b>Principles:-</b> <ul style="list-style-type: none"> <li>• the enjoyment of amenity would not reasonably be expected; or</li> <li>• there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or</li> <li>• 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.</li> </ul> <b>Indicative Examples:-</b> <ul style="list-style-type: none"> <li>• Playing fields, farmland (unless commercially-sensitive horticultural).</li> <li>• Footpaths and roads.</li> <li>• Short-term car parks.</li> </ul> | Low         |

**Table 11.1.3 Sensitivities of People and Property Receptors to PM<sub>10</sub>**

| Receptor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Sensitivity |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Principles:-</b> <ul style="list-style-type: none"> <li>Locations where members of the public are exposed over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM<sub>10</sub>, a relevant location would be one where individuals may be exposed for eight hours or more in a day).</li> </ul> <b>Indicative Examples:-</b> <ul style="list-style-type: none"> <li>Residential properties.</li> <li>Schools, hospitals and residential care homes.</li> </ul>                                                                                                    | High        |
| <b>Principles:-</b> <ul style="list-style-type: none"> <li>Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM<sub>10</sub>, a relevant location would be one where individuals may be exposed for eight hours or more in a day).</li> </ul> <b>Indicative Examples:-</b> <ul style="list-style-type: none"> <li>Office and shop workers (but generally excludes workers occupationally exposed to PM<sub>10</sub> as protection is covered by Health and Safety at Work legislation).</li> </ul> | Medium      |
| <b>Principles:-</b> <ul style="list-style-type: none"> <li>Locations where human exposure is transient exposure.</li> </ul> <b>Indicative Examples:-</b> <ul style="list-style-type: none"> <li>Public footpaths.</li> <li>Playing fields, parks.</li> <li>Shopping streets.</li> </ul>                                                                                                                                                                                                                                                                                                                            | Low         |

1.5 The IAQM methodology combines consideration of the pathway and receptor to derive the 'sensitivity of the area'. Table 11.1.4, Table 11.1.5 and Table 11.1.6 show how the sensitivity of the area has been derived for this assessment.

**Table 11.1.4 Sensitivity of the Area to Dust Soiling Effects on People and Property**

| Receptor Sensitivity | Number of Receptors <sup>a</sup> | Distance from the Source (m) <sup>b</sup> |        |        |      |
|----------------------|----------------------------------|-------------------------------------------|--------|--------|------|
|                      |                                  | <20                                       | <50    | <100   | <350 |
| High                 | >100                             | High                                      | High   | Medium | Low  |
|                      | 10-100                           | High                                      | Medium | Low    | Low  |
|                      | 1-10                             | Medium                                    | Low    | Low    | Low  |
| Medium               | >1                               | Medium                                    | Low    | Low    | Low  |
| Low                  | >1                               | Low                                       | Low    | Low    | Low  |

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout.

<sup>a</sup> The total number of receptors within the stated distance has been estimated. Only the highest level of area sensitivity from the table has been recorded.

<sup>b</sup> For trackout, the distances have been measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and trackout impacts have only been considered up to 50 m from the edge of the road.

**Table 11.1.5 Sensitivity of the Area to Human Health Impacts**

| Receptor Sensitivity | Annual Mean PM <sub>10</sub> Concentration <sup>a</sup> | Number of Receptors <sup>b, c</sup> | Distance from the Source (m) <sup>d</sup> |        |        |        |      |
|----------------------|---------------------------------------------------------|-------------------------------------|-------------------------------------------|--------|--------|--------|------|
|                      |                                                         |                                     | <20                                       | <50    | <100   | <200   | <350 |
| High                 | > 32 µg.m <sup>-3</sup>                                 | >100                                | High                                      | High   | High   | Medium | Low  |
|                      |                                                         | 10-100                              | High                                      | High   | Medium | Low    | Low  |
|                      |                                                         | 1-10                                | High                                      | Medium | Low    | Low    | Low  |
|                      | 28 - 32 µg.m <sup>-3</sup>                              | >100                                | High                                      | High   | Medium | Low    | Low  |
|                      |                                                         | 10-100                              | High                                      | Medium | Low    | Low    | Low  |
|                      |                                                         | 1-10                                | High                                      | Medium | Low    | Low    | Low  |
|                      | 24 - 28 µg.m <sup>-3</sup>                              | >100                                | High                                      | Medium | Low    | Low    | Low  |
|                      |                                                         | 10-100                              | High                                      | Medium | Low    | Low    | Low  |
|                      |                                                         | 1-10                                | Medium                                    | Low    | Low    | Low    | Low  |
|                      | < 24 µg.m <sup>-3</sup>                                 | >100                                | Medium                                    | Low    | Low    | Low    | Low  |
|                      |                                                         | 10-100                              | Low                                       | Low    | Low    | Low    | Low  |
|                      |                                                         | 1-10                                | Low                                       | Low    | Low    | Low    | Low  |
| Medium               | > 32 µg.m <sup>-3</sup>                                 | >10                                 | High                                      | Medium | Low    | Low    | Low  |
|                      |                                                         | 1 – 10                              | Medium                                    | Low    | Low    | Low    | Low  |
|                      | 28 – 32 µg.m <sup>-3</sup>                              | > 10                                | Medium                                    | Low    | Low    | Low    | Low  |
|                      |                                                         | 1-10                                | Low                                       | Low    | Low    | Low    | Low  |
|                      | < 28 µg.m <sup>-3</sup>                                 | >1                                  | Low                                       | Low    | Low    | Low    | Low  |
| Low                  | -                                                       | >1                                  | Low                                       | Low    | Low    | Low    | Low  |

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout.

a This refers to the background concentration derived from the assessment of baseline conditions later in this report. The concentration categories listed in this column apply to England, Wales and Northern Ireland but not to Scotland.

b The total number of receptors within the stated distance has been estimated. Only the highest level of area sensitivity from the table has been recorded.

c For high sensitivity receptors with high occupancy (such as schools or hospitals), the approximate number of occupants has been used to derive an equivalent number of receptors.

d For trackout, the distances have been measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and trackout impacts have only been considered up to 50 m from the edge of the road.

**Table 11.1.6 Sensitivity of the Area to Ecological Impacts**

| Receptor Sensitivity | Distance from the Source (m) <sup>a</sup> |        |
|----------------------|-------------------------------------------|--------|
|                      | <20                                       | <50    |
| High                 | High                                      | Medium |
| Medium               | Medium                                    | Low    |

| Low                                                                                                                                                                                                 | Low | Low |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| The sensitivity of the area has been derived for demolition, construction, earthworks and trackout and for each designated site.<br>a Only the highest level of area sensitivity has been recorded. |     |     |

1.6 The IAQM dust guidance lists the following additional factors that can potentially affect the sensitivity of the area and, where necessary, professional judgement has been used to adjust the sensitivity allocated to a particular area:

- 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 the works will take place;
- any conclusions drawn from local topography;
- duration of the potential impact, as a receptor may become more sensitive over time; and
- any known specific receptor sensitivities which are considered go beyond the classifications given in the table above.

1.7 The matrices in Table 11.1.7, Table 11.1.8, Table 11.1.9 and Table 11.1.10 have been used to assign the risk for each activity to determine the level of mitigation that should be applied. For those cases where the risk category is 'negligible', no mitigation measures are required beyond those mandated by legislation.

**Table 11.1.7 Risk of Dust Impacts – Demolition**

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

**Table 11.1.8 Risk of Dust Impacts – Earthworks**

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

**Table 11.1.9 Risk of Dust Impacts – Construction**

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

**Table 11.1.10 Risk of Dust Impacts – Trackout**

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