Local Government Air Quality Toolkit

Dust from small quarries visual guide

Visual examples to help council officers when investigating complaints about dust from quarries

NSW GOVERNMENT

Acknowledgement of Country

Department of Climate Change, Energy, the Environment and Water acknowledges the Traditional Custodians of the lands where we work and live.

We pay our respects to Elders past, present and emerging.

This resource may contain images or names of deceased persons in photographs or historical content.

The Local Government Air Quality Toolkit has been developed by Department of Climate Change, Energy, the Environment and Water in collaboration with the NSW Environment Protection Authority, the NSW Department of Planning, Housing and Infrastructure, Local Government NSW and local councils.

Cover photo: Machinery and stockpiles in a small quarry. Zephyr Environmental

Artist and designer Nikita Ridgeway from Aboriginal design agency – Boss Lady Creative Designs, created the People and Community symbol.

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Introduction

For smaller, non-scheduled quarrying operations that do not require an environment protection licence, the local government is the appropriate regulatory authority for the purposes of the *Protection of the Environment Operations Act 1997*.

This visual guide provides information to assist council officers when investigating complaints from local residents regarding dust impacts from nearby quarries and/or engaging with quarry operators to improve operational dust management.

The images in this visual guide are labelled with traffic light symbols indicating the effectiveness or otherwise of management of odour and particulate issues (Figure 1).

Figure 1 Key to traffic light symbols

Chapter 2 of the Local Government Air Quality Toolkit – *Resource pack* includes a checklist for conducting a site inspection for dust generating activities and investigating dust-related complaints.

The activities on smaller quarries generally involve:

- excavation
- material transfer to trucks
- haulage
- dumping
- screening and crushing
- material transfer to stockpiles
- material transfer off-site to market.

Large conveyor systems or train loadout facilities, which can also cause air quality impacts if not managed properly, are generally not found at smaller quarries.

The types of equipment used for excavation will largely depend on the type of material being quarried. For example, sand may simply need a front-end loader, while hard rock quarries may require rock breaking equipment and excavators.

A general layout of these activities around a quarry site may resemble something like that shown in Figure 2.

Figure 2 **General layout of a quarry site**

Source: Nearmap aerial image. Overlaid information added by DCCEEW

Wheel generated dust

Wheel generated dust can often be the most significant component of total particulate (dust) emissions, however, it can also be one of the most straightforward sources to control.

There are several ways to do this, but the most common / effective method is to use dust suppression (usually water) and keep the unsealed surfaces damp. Keeping haulage routes as short as possible is good practice, as is using low silt content material to construct these roads. It is acknowledged that these things may not always be possible given individual site constraints.

Water carts are often employed at quarry sites and should be used regularly to avoid roads drying out, especially during warm summer months or prolonged dry periods.

Figure 3 shows good use of a water cart, ensuring sufficient coverage across the width of the road.

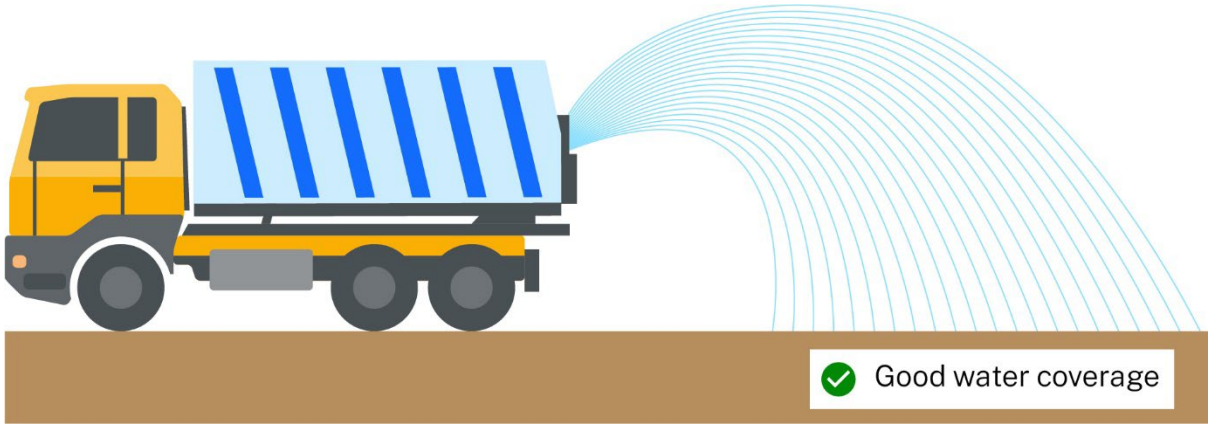

Figure 3 **Water cart spraying across the width of the road**

Operators should regularly evaluate the amount of dust generated by heavy vehicle movements on unsealed roads to determine when watering is required. The NSW EPA *Dust Assessment Handbook* suggests that if the dust is above the truck wheel height, further dust suppression is required.

A useful visual guide from the *Dust Assessment Handbook* has been adapted in Figure 4. While these images show haul trucks from larger mining operations, the principle still applies for smaller quarry vehicles.

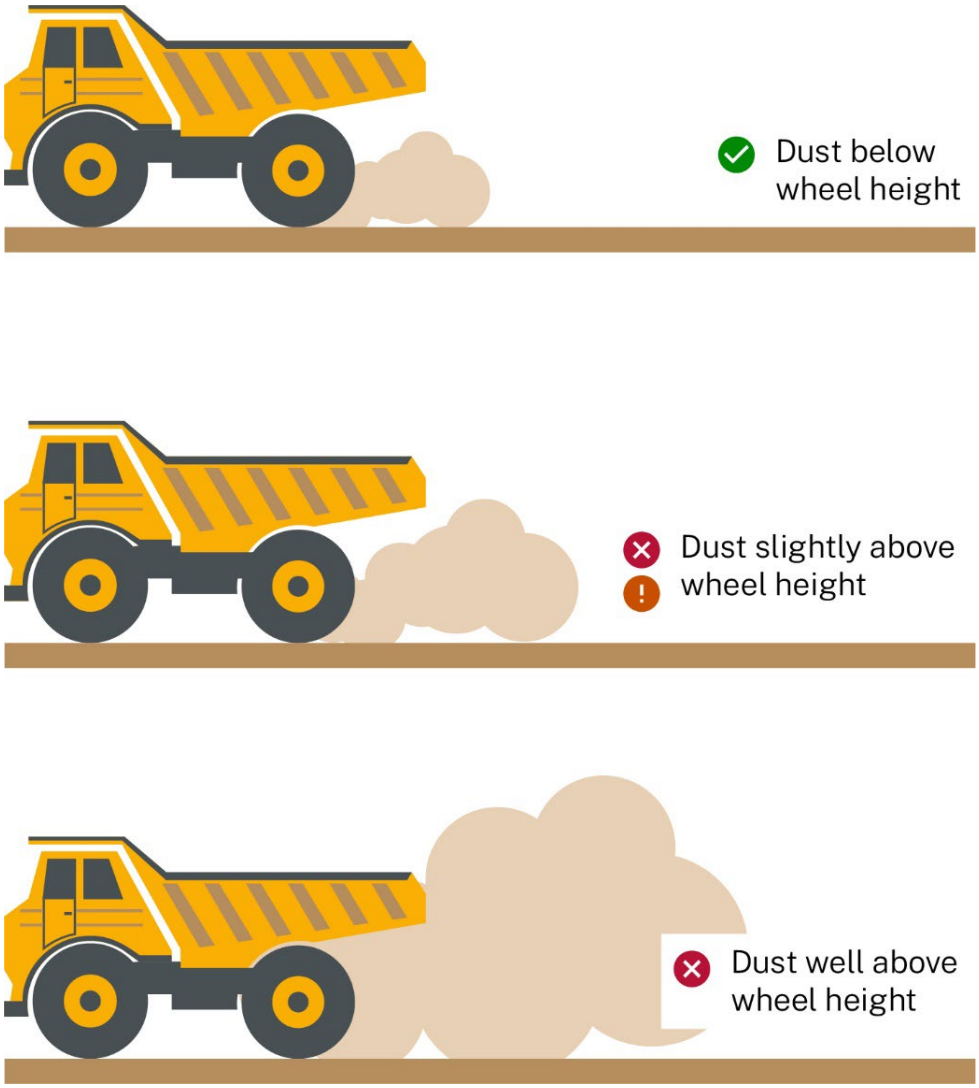

Figure 4 **Visual guide to when further dust suppression is required**

As vehicles leave a quarry site carrying the final product, they typically pass over a weighbridge. Good practice will include a wheel bath to wash the wheels prior to leaving the site, to avoid tracking mud and dirt onto public roads.

Figure 5 shows an example of good practice, featuring a dry rumble grid (also referred to as a 'grizzly') at the approach to the wheel bath, a wet rumble grid upon exit and reasonably clean water inside the bath. Water should be replaced regularly to avoid becoming muddy as this silt-laden water is then tracked out onto the local public roads where it dries, becoming a source of wind-blown dust. Figure 6 shows a muddy water bath that is allowing mud to be tracked out.

Figure 5 **Effective wheel washing set-up**
Source: Jane Barnett/Zephyr Environmental

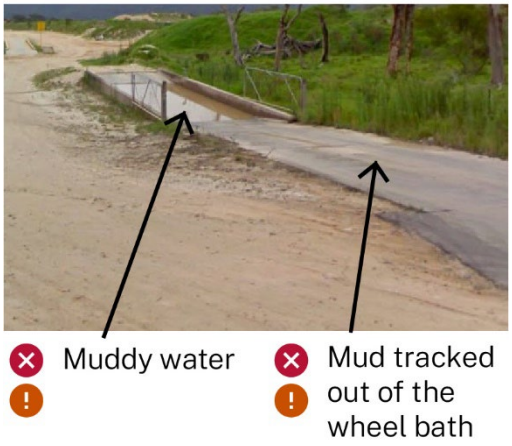

Figure 6 **Wheel washing set-up with reduced effectiveness due to muddy water**
Source: Jane Barnett/Zephyr Environmental

Stockpiles

Another significant dust source at quarry sites is wind erosion from exposed surfaces and stockpiles. Again, water-based dust suppression is generally the most effective management method in this case. Stockpiles are generally too large to cover and are constantly being loaded and depleted, so this is often not a practical solution.

Figure 7 shows part of a sprinkler system used to water the adjacent stockpiles as required.

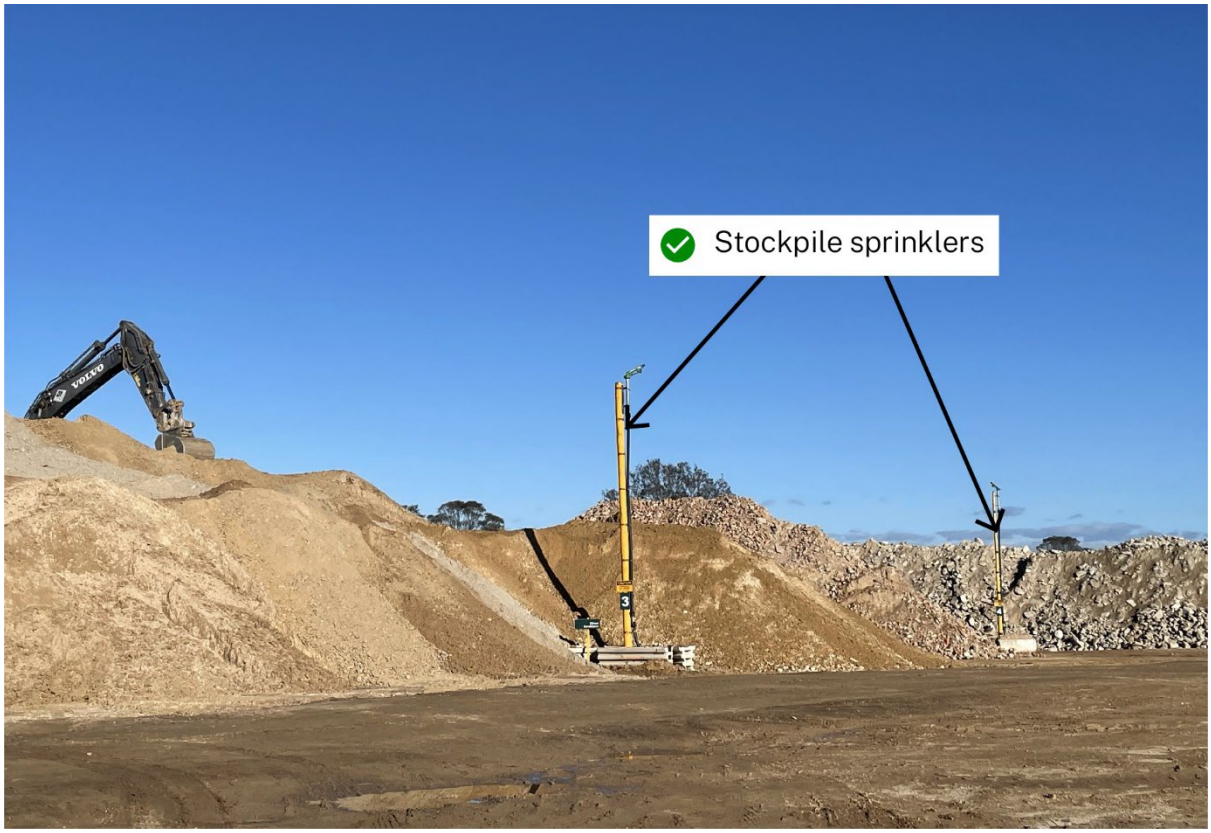

Figure 7 **Sprinklers used to suppress dust from stockpiles**
Source: Jane Barnett/Zephyr Environmental

Mobile crushers and screens are often a feature of smaller quarries. The mobility provides versatility to operators and allows haulage distances to be shortened (as mentioned above, a good practice measure for reducing wheel generated dust).

Figure 8 shows a mobile crusher in close proximity to a raw material stockpile, allowing the hopper to be loaded directly from the stockpile without the need for material transfer via truck.

Figure 8 **Mobile crusher located close to raw material stockpile**
Source: Jane Barnett/Zephyr Environmental

Figure 9 shows an aerial view of a mobile screen. This plant is fed by a front-end loader from the adjacent raw material stockpile. It then screens for material of 3 different sizes and drops each onto an individual smaller product stockpile. Each step in this process requires the transfer of material and can produce dust. Water sprays should be used when winds are high to minimise the dust generation.

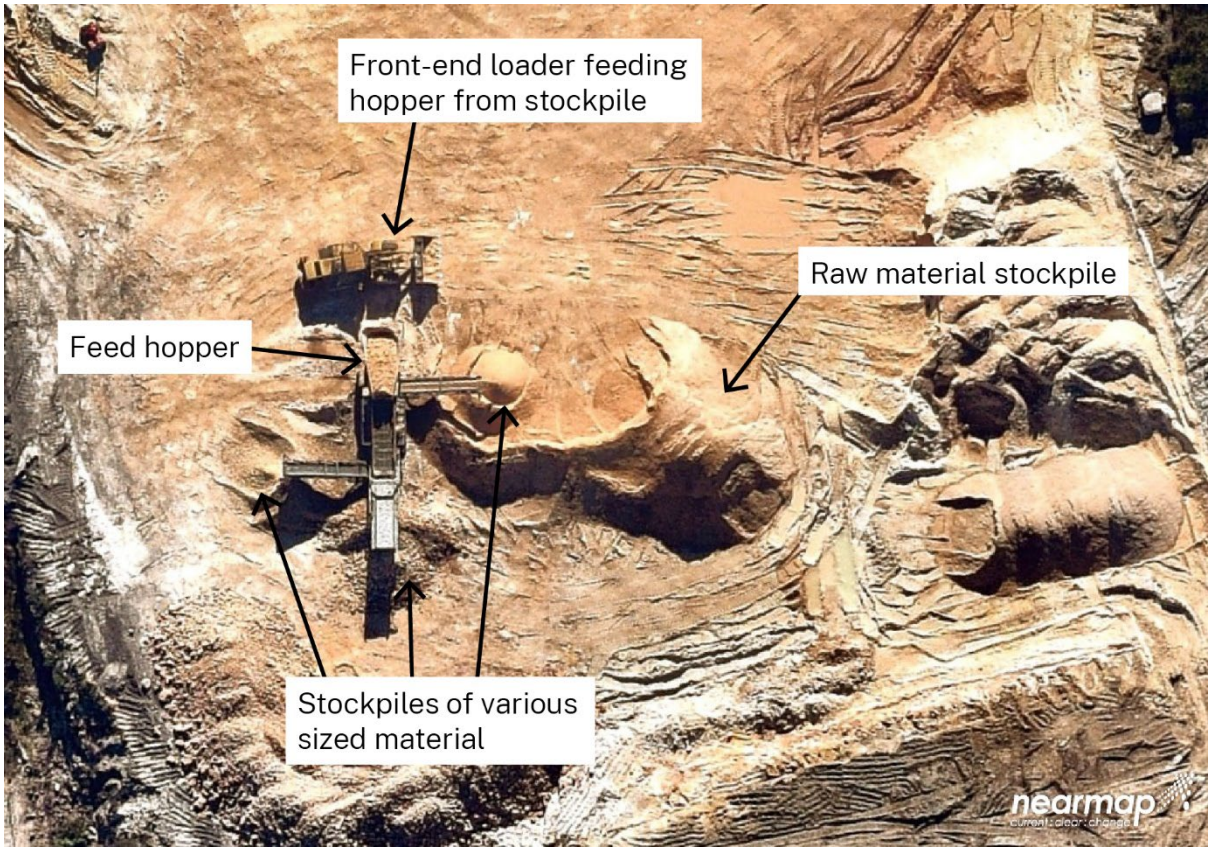

Figure 9 **Mobile screen with stockpiles for screened material**
Source: Nearmap aerial image. Overlaid information added by DCCEEW

Another good practice measure is to minimise drop heights during material transfer. Figure 10 shows a very short drop height from the front-end loader to the stockpile.

Figure 10 Short drop height from loader to stockpile

Figure 11 shows a much higher drop height from the front-end loader to the truck. This material is also clearly too dry and the dust generated could be reduced with management by water sprays.

Figure 11 High drop height and dry material generates excessive dust

More information

- EPA Victoria Guidance for assessing nuisance dust [PDF 424 KB]
- Guidance on the Assessment of Mineral Dust Impacts for Planning [PDF 1.6 MB]
- NSW EPA Dust Assessment Handbook