

Table 1: Good industry practice for dust control measures and comparison against the proposed dust mitigation for Roydon Quarry.

Key process	Good practice mitigation measures outlined by IAQM	Mitigation measures proposed by Fulton Hogan
<p>Phasing of extraction activities, Site design and location of dust-generated activities</p>	<p>Consideration should be given to the relationship of site activities to sensitive locations outside the site. As far as practicable, dust-generating activities should be located away from high and medium sensitive receptors. It is important that the minimisation of dust through site design is addressed for each phase of the works operation.</p> <p>Dust-generating activities should, where possible, be located where maximum protection can be obtained from topography, woodland or other sheltering features.</p>	<ul style="list-style-type: none"> ■ Dust-generating activities such as fixed processing plant will be located at least 500 m to the site boundary. ■ No stockpiling is proposed within 250 m of the site boundary. ■ All works will have a setback of 20 m from the site boundary. ■ Existing tree shelter belts are to be maintained in good order and additional plantings where none presently exist.
<p>Provision for dust mitigation measures</p>	<p>Perimeter screening bunds (ideally vegetated) or semi-permeable fences, and over shorter periods netting screens may be effective. Planning and design of the scheme should make provision for water supply to meet the site demand for mitigation and damping.</p>	<ul style="list-style-type: none"> ■ Bunds are to be grassed and vegetated as soon as practicable and the cover maintained. ■ Ensure that sufficient water and distribution equipment are available and ready to use for dust control. ■ If it is a dry day (i.e., there has been no rain in the last 24 hours and ground conditions are visibly dry) and dust is visible or being detected by the continuous monitors of if wind speed is (or is forecast to be during that day) above 7 m/s: <ul style="list-style-type: none"> a) Use a solid-set water system (for example fog cannons) and water cart at the start of the day to dampen down exposed surfaces (e.g., they have not been re-grassed or covered with a layer of dust suppressant or pea gravel); b) Use of suppression systems throughout the day as necessary, particularly for the haul roads, field

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		<p>conveyor loading hopper, and working face area. During particularly dry conditions this may require reapplication of water over unpaved surfaces at a greater frequency of 30 minutes or less.</p>
<p>Soil and overburden handling</p>	<p>Site stripping and reinstatement operations, and overburden handling activities should be avoided during dry and windy conditions.</p>	<ul style="list-style-type: none"> ■ Pre-dampen the land to be stripped during dry days to minimise the potential for dust from overburden stripping. ■ Apply water or dust suppressants to ensure that any exposed earth on the bund or stockpiles is dampened or a crust formed to minimise dust during strong wind conditions until the grass cover is established. ■ Pre-plan and verify weather forecast prior to bund formation to avoid these works when strong winds are expected and when the ground surface is particularly dry. ■ Stockpile volumes are not to exceed 200,000 m³. ■ Stockpile heights are not to exceed that of the top of the site bunds. ■ Stockpiling is not to occur closer than 100 m to the site boundary. ■ Visually monitor the stockpiles on a regular basis, for dust discharges or the potential for them, and apply additional mitigation if necessary. ■ Minimise drop heights from trucks to tip head area. ■ Use water trucks/sprays or fogging systems to dampen the working area in so dust visible and monitored dust levels are low (below trigger levels and no large visible dust plumes being generated at the site).

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Equipment and vehicles	<p>Minimise haul route distances and to locate haul routes away from receptors. A long-paved road after a wheel or vehicle washer before joining the public highway, where feasible, reduces the risk of trackout off-site.</p>	<ul style="list-style-type: none"> ■ Ensure that the first 100 m of the site access roadway is sealed and kept clean using regular vacuum sweeping. ■ Install a rumble strip or judder bars at the site side of the sealed access roadway and keep them in good working order by regular inspection and cleaning. ■ Ensure loads leaving and entering the site comply with the truck loading code. Loads leaving the site should be sprayed with water or covered. ■ Minimise drop heights when loading haul trucks, conveyor hoppers and moving material. ■ The primary method of transporting material from the working face is using field conveyors. Where transport of material is required using haul trucks, control their emissions as described above for general vehicle movements.
Planting	<p>Existing woodland/hedgerows along site boundaries should be retained where possible. Advance planting of native trees/hedgerows should be considered.</p>	<ul style="list-style-type: none"> ■ Existing tree shelter belts are to be maintained in good order and enhanced with new plantings where no plantings exist. (see LVIA - Appendix E of Application)
Planning of activities	<p>Some activities should ideally be planned only during favourable weather conditions. Where possible, particularly dusty activities should be avoided during extended periods of dry and windy conditions.</p>	<p>Assess weather and ground conditions (dryness and wind) at the start of each day and ensure that applicable mitigation measures and methods are ready for use. At any time, including outside normal operating hours, if visible dust is blowing beyond the site boundary or if targeted monitoring triggers are reached and irrespective of it being a dry, windy day:</p> <ol style="list-style-type: none"> a) Cease all dust generating activities; b) Continue all dust suppression activities;

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		<p>c) Carry out the investigation of possible causes immediately and respond with appropriate corrective and preventive actions. Note, this may include immediate watering of both active and inactive exposed surfaces, even if dust generating activities have been ceased;</p> <p>d) Only resume site activities (other than dust suppression) once the appropriate mitigation measures are in place to prevent visible dust blowing beyond the site boundary.</p>
<p>Mineral processing</p>	<p>Wherever practicable, crushing and screening should take place within fully enclosed structures, or where this is not possible (e.g. in the case of mobile plant) mineral processing should take place within a sheltered part of the quarry, away from boundaries with off-site receptors. The following measures are considered to be effective in minimizing dust emissions during the mineral processing process:</p> <ul style="list-style-type: none"> ■ dampen material, for example, wetting down of rock stockpiles prior to crushing operation ■ protect equipment (for example, conveyors, process plant) by partial or complete enclosure within housing ■ use crushing and screening plant within its design capacity ■ maintain good standards of all plant and equipment. ■ Materials handling: Enclose transfer points and conveyor discharges where visible dust emissions occur. 	<ul style="list-style-type: none"> ■ The fixed processing plant is to be located within the pit, at least 500 m from any sensitive off-site location. ■ The processing plant is to be fitted with water sprays or fogging systems and these are to be used to suppress visible dust discharges from processing plant. ■ Portable processing plant is to be fitted or supported with water sprays or fogging systems and these are to be used suppress dust discharges. ■ Portable processing plant are to be no closer than 250 m to any sensitive off-site location. ■ If a portable processing plant is between 250 and 500 m from a sensitive off-site location, the plant will only be used when the wind is not blowing towards sensitive receptor locations within 250 m.

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<p>Vehicle movements:</p>	<ul style="list-style-type: none"> ■ avoiding abrupt changes in direction ■ regular clearing, grading and maintenance of haul routes ■ setting appropriate site speed limits. If practicable, set site-specific and enforceable speed limits (e.g. 10 mph. on unmade routes). Where not practicable, the Quarry Manager should set speed limits according to operating conditions at the time ■ fitting heavy plant with upswept exhausts and radiator fan shields ■ evenly loading vehicles to avoid spillages ■ regular application of water, whether by bowser or by fixed sprays, in dry conditions ■ use paved roads where practicable, ensure mobile plant has upward directing exhausts and radiator fan shields. 	<ul style="list-style-type: none"> ■ Limit vehicle speeds on site to 15 kilometres per hour and clearly signpost this limit on all internal roads. ■ Regularly apply water to haul and access roads during any conditions when dust is likely to be discharged from them (dry and windy). ■ If water application is insufficient, use chemical stabilisers or other equivalent measures on unsealed road surfaces. ■ Ensure that at least the first 100 m of the site access roadway is sealed and kept clean using regular vacuum sweeping. ■ Install a rumble strip or judder bars at the site side of the sealed access roadway and keep them in good working order by regular inspection and cleaning. <p>Ensure loads leaving and entering the site comply with the truck loading code. Loads leaving the site should be sprayed with water or covered.</p>
<p>Site specific dust management plan and effective site management practices</p>	<ul style="list-style-type: none"> ■ Management procedures should be outlined within the DMP. ■ Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. ■ Provide training to the site personnel on dust mitigation. 	<p>All the management procedures are outlined within the DMP, which include dust mitigation and management practice, staff training, complaint response and recording procedures.</p>

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Monitoring	Implement an appropriate monitoring scheme. This can range from visual inspections, dust deposition/flux monitoring, to real-time PM ₁₀ continuous monitoring locations.	<ul style="list-style-type: none"> ■ Site inspections of visible dust emissions will be carried out routinely throughout each day of operation and findings and mitigation actions logged electronically. ■ A permanent real-time PM10 monitor will be installed at the eastern boundary of directly downwind of the active quarry area for southwest wind conditions. ■ A second monitoring site shall be operated directly downwind of the processing plant area also for southwest wind conditions. Mobile monitor(s) shall be operated at locations between sensitive receptors (within 500 m) and the quarry activities. ■ Instruments shall report 1-minute averages for internal dust management purposes. ■ Monitor continuous 1-minute averages for wind speed and direction, and particulate matter concentrations for internal management purposes. ■ Set trigger levels for instigating increased dust suppression measures.
Communication	Maintain good communication to help alleviate anxieties between the operators and the surrounding communities.	<p>Ensure a 24-hour contact is available, with details posted in clear view at the site entrance.</p> <p>Fulton Hogan is proposing to establish a Community Liaison Group (CLG) which shall meet on a quarterly basis. Representatives shall be invited from the Templeton Residents Association (TRA), Weedon's Residents Association (WRA), SDC and CRC. A process shall be put in place as to the frequency, layout and membership of these meetings.</p>