

## 7 Quarries

Quarries are potentially a major source of sediment. They are often exposed for long periods of time and the area of bare earth can be considerable. Their continuous operation means that site conditions continually change. Careful planning is required to ensure that the operations are carried out with minimal environmental impact. It is the responsibility of the quarry operator to minimise the adverse environmental effects of the operation.

This section of these Guidelines is designed to help quarry operators address soil and water problems which may arise as a result of quarry operations. It should be read in conjunction with Sections 5 and 6 of these Guidelines, which detail specific erosion and sediment control practices. Quarries are required to produce management plans covering the various aspects of their operation. These Guidelines will help in the production of such plans.

The following specific issues associated with quarry operations are discussed below.

- Road access
- Stormwater
- Overburden disposal
- Stockpile areas
- Rehabilitation of worked out areas
- Riparian protection areas
- Maintenance schedule for erosion and sediment control treatment structures

### 7.1 Road Access

Many quarries in the Hawke's Bay Region are serviced by metal roads, used in all weather conditions. Vehicle movements during rain can generate a lot of sediment. These roads, however, are not always within the designated quarry area and therefore, are not covered by the Quarry Management Plan. Careful consideration needs to be given to managing roads and traffic. In cases such as these, erosion and sediment control measures need to be installed along roads as outlined in Sections 5 and 6 of these Guidelines.

Where possible, incorporate road access into the Quarry Management Plan, ensuring all measures necessary are put in place to protect receiving environments.

### 7.2 Stormwater

#### 7.2.1 Clean Runoff

As far as it is possible, divert clean water flow away from working and bare areas to prevent them from becoming contaminated by sediment. This aids in reducing the volume of contaminated runoff needing to be controlled and treated. Runoff Diversion Channels around the working site, as outlined in Section 5.1, are the simplest way to deal with the clean runoff.

### 7.2.2 Contaminated Runoff

Any runoff from bare areas will collect sediment and become contaminated. This contaminated runoff, which includes runoff from aggregate wash processes, must be contained and treated in an appropriate manner before being discharged to natural watercourses. The Quarry Management Plan must detail the methods for containment and treatment of all contaminated runoff. Particular attention should be paid to sensitive areas such as permanent watercourses, watercourse crossings and steeply sloping bare areas. Design all structures for the 5% AEP rainfall event.

### 7.3 Overburden Disposal

Methods of overburden disposal vary for each quarry operation. Overburden removal and disposal sites can be a major source of erosion and sediment discharges from quarries, particularly if the disposal site is not properly located and managed. The Quarry Management Plan for the site should give a reasonable indication of the following.

- The timing and extent of overburden stripping, which will be related to an expected volume and area of extraction.
- The methods to be employed for disposing the overburden.
- Ongoing management of disposal sites, including provision for regular disposal of material trapped in sediment retention ponds.
- If overburden disposal is dealt with in isolation from the Quarry Management Plan, consideration must be given to the following points.
- Selection of disposal site (why the site was chosen).
- Stability of the site and subsequent overburden fill (batter slopes, safety factors, benching, underlying material, drainage).
- Erosion and sediment control measures.
- Rehabilitation of disposal site (revegetation, contouring).

### 7.4 Stockpile Areas

Stockpile areas include those used for stockpiling both raw or finished quarry products prior to further processing or final despatch. These areas can be a major source of contaminated runoff if not properly controlled. Position stockpiles well away from any watercourses and runoff flow paths.

### 7.5 Rehabilitation of Worked Out Areas

Planning for rehabilitation must be an integral part of all quarry operations. A properly planned and implemented rehabilitation programme will reduce the need for expensive ongoing erosion control, and control and treatment of contaminated runoff. The aim of site rehabilitation, whether temporary or permanent, is to maintain the site in a condition such that erosion and contaminated runoff are limited to an acceptable level. The prime areas for consideration are:

- Establishing suitable final ground contours;
- Establishing a suitable environment for vegetation growth;
- Revegetating the site with suitable vegetation cover.

## 7.6 Riparian Protection Areas

Riparian protection areas rely on vegetation to provide a buffer between the quarry operations and a water body such as a watercourse or wetland. These margins act as a physical barrier to keep machines away from sensitive areas as well as serving as a last resort sediment trap for diffuse runoff and/or unforeseen discharges. Do not, however, rely on riparian protection areas as a primary sediment control mechanism.

## 7.7 Maintenance Schedule for Erosion and Sediment Control or Treatment Structures

Because quarry operations continue over a very long time frame, it is important to develop a maintenance schedule for any control/treatment structures that are put in place. Money spent on designing and constructing control/treatment structures will be wasted if these structures are not adequately maintained.

Properly maintained structures will provide optimum performance at all times, thereby minimising the adverse environmental effects of the quarry operation. Conversely, poorly maintained structures are likely to result in unsatisfactory environmental protection despite being initially well designed and constructed.

Develop a maintenance schedule for the site that clearly indicates what is to be done in terms of visual inspections and maintenance works. Undertake routine maintenance works when they will cause the least possible detrimental environmental effects (either directly or indirectly). For example, do not clean sediment retention ponds during or immediately after rainfall events. To ensure that the operation of the pond is not affected at these critical times, maintenance should be done prior to events.

It is also particularly important that all control/treatment structures are inspected after significant rainfall events, or during prolonged rainfall, in addition to any regular scheduled inspections.

In the maintenance schedule include a procedure for immediately repairing and remedying any damage caused to control/treatment structures from daily quarry activities.

Within the overall quarry operation, give the inspection and maintenance of control/treatment structures a high priority. Ensure every person involved in the quarry operation is familiar with all aspects of erosion and sediment control on the site, including any special conditions of consents that are relevant. For example, specific water quality sampling requirements.

For all aspects of quarry operations where erosion and sediment controls are required, install the erosion and sediment control practices as specified in these Guidelines.

## Appendix A

### 6.3.2 VEGETATION CLEARANCE AND SOIL DISTURBANCE ACTIVITIES

Rule	Activity	Classification	Conditions/Standards/Terms	Matters for Control/Discretion	Non-notification
<p>7</p> <p><b>Vegetation clearance<sup>25</sup> and soil disturbance</b></p> <p><i>Refer to POL 3, 67, 71</i></p>	Vegetation clearance or soil disturbance activities <sup>26</sup> .	Permitted	<p>a. All cleared vegetation, disturbed soil or debris shall be deposited or contained to reasonably prevent the transportation or deposition of disturbed matter into any water body<sup>26</sup>.</p> <p>b. Vegetation clearance or soil disturbance shall not give rise to any significant change in the colour or clarity of any adjacent water body, after reasonable mixing.</p> <p>c. No vegetation clearance shall occur within 5 metres of any permanently flowing river, or any other river with a bed width in excess of 2 metres, or any other lake or wetland, except that this condition shall not apply to:</p> <p>i. the clearance of plantation forestry established prior to the date of this Plan becoming operative, or</p> <p>ii. the areas identified in Schedule X to this Plan.</p> <p>d. Deposition of soil or soil particles across a property boundary shall not be objectionable or offensive, cause property damage or exceed 10 kg/m<sup>2</sup>.</p> <p>e. Where the clearance of vegetation or the disturbance of soil increases the risk of soil loss the land shall be:</p> <p>i. re-vegetated as soon as practicable after completion of the activity, but in any event no later than 18 months with species providing equivalent or better land stabilisation; or</p> <p>ii. retained in a manner which inhibits soil loss.</p>		

<sup>25</sup> "Vegetation clearance" means the cutting, burning, clearing or destruction (including destruction by spraying) of trees, shrubs, or plants.  
"soil disturbance" means the disturbance of soil by any means including blading, contouring, ripping, discing, root raking, moving, ploughing, removing, cutting and blasting.

Rule	Activity	Classification	Conditions/Standards/Terms	Matters for Control/Discretion	Non-notification
<p>8</p> <p><b>Vegetation clearance and soil disturbance</b></p> <p>Refer to POL 3, 67, 71</p>	<p>Vegetation clearance or soil disturbance activities which do not meet the conditions in Rule 7.</p>	<p>Restricted discretionary</p>		<p>a. The conditions, standards or terms which activity cannot comply with, and the related environmental effects.</p> <p>b. Monitoring and reporting requirements.</p> <p>c. Duration of consent.</p> <p>d. Review of consent conditions.</p>	<p>Applications may be considered without notification, without the need to obtain the written approval of affected persons.</p>

**Vegetation clearance and soil disturbance exclude:**

- The normal maintenance of legally established structures, roads, tracks, railway lines and river beds.
- The clearance of grasses, forest thinning, and agricultural and horticultural crops.
- The clearance of isolated or scattered regrowth on productive pasture.
- The clearance of any indigenous vegetation understorey beneath plantation forests.
- The clearance of noxious weeds covered by the Regional Plant Pest Management Strategy prepared under the Biosecurity Act, 1993.
- Non-motorised soil disturbance activities.
- Thrusting, boring, trenching or mole ploughing associated with cable or pipe laying or a network utility operation.
- Soil disturbance undertaken by a mine or quarry operation which either had a valid mining licence at the date the Proposed Regional Resource Management Plan was publicly notified (15 April 2000) or is lawfully established.
- Cultivation and grazing.
- Foundations works for structures.
- Construction and maintenance of fences and drains.

<sup>26</sup> **Explanation of Rule 7 (a):** In considering whether condition/standard/term (a) in Rule 7 has been met, Council shall have regard to recognised Industry Codes of Practice, Best Practice Guidelines and Environmental Management Plans relevant to and adopted in carrying out the activity.

Note: 10 kg/m<sup>2</sup> of dry soil is equivalent to 5 mm depth assuming a specific gravity of 2 kg/litre.