

TP223 - Forestry operations in the Auckland region

A guideline for erosion and sediment control

PART A — BACKGROUND INFORMATION



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1.0 BACKGROUND

1.1 Purpose of this Guideline

Following consultation with representatives of the Forestry Industry working in the Auckland area, the Auckland Regional Council (ARC) determined that a specific set of guidelines for earthworks and general land disturbing activities associated with forestry operations would be developed using ARC Technical Publication No. 90: *Erosion and Sediment Control Guidelines for Land Disturbing Activities March 1999*, (TP90) as a base. It builds upon the concepts and practices from TP90 which addresses erosion and sediment control across the region. This guideline also focuses on erosion and sediment control, but from a forestry perspective, and so there are control measures in this guideline that are not contained within TP 90, and vice versa. Following the practices and methodologies in this guideline will minimise any erosion and sedimentation that may arise from forestry operations and help forest managers and contractors meet their statutory requirements.

1.2 Guideline Layout

Consultation with the forestry industry indicated that the preferred concept for developing the guideline was to incorporate a series of “toolboxes” for specific operations. This concept uses a mix and match approach and enables a number of control options to be considered that can obtain a minimum standard of environmental outcome. Some examples of these configurations are outlined in Section 9.

This guideline is split into three sections. The first is an introductory section that discusses whether a resource consent is needed, potential sediment related environmental impacts, erosion and sediment control principles, and earthworks and harvest management plans.

The second section provides technical specifications on a selection of commonly used erosion and sediment control practices. An Operators Field Guide has been developed from this section to provide a practical reference guide for those constructing the erosion and sediment control measures on site.

The third section discusses the principles associated with the application of the various control measures in relation to different forestry operations (roading, tracking, landing sites, etc).

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1.3 Extent of the Guideline

The objective of this guideline is to provide information on practices and methodologies that will minimise any erosion and consequent sedimentation that may arise from forestry practices. They do not replace or override in any manner other statutory requirements such as the Health and Safety in Employment Act or resource consents from the ARC and various Territorial Authorities.

In addition, it is suggested that you contact the ARC to determine the status of the relevant regional plan rules and confirm that your operation, including any works proposed in streams, complies with the relevant regulations.

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2.0 DO I NEED A CONSENT?

2.1 General

At present, the harvesting of trees in the Auckland region is a permitted activity subject to various conditions and does not require a resource consent from the Auckland Regional Council (ARC). In general, these conditions relate to: the requirement to notify the ARC when works commence; the installation and maintenance of effective erosion and sediment controls; the stabilisation of disturbed areas; operations near watercourses and removal of slash within these streams and finally; the discharge criteria attached to the permitted activity.

On the other hand, earthworks, and works in permanently flowing watercourses (Category 1 streams), will require resource consents once the work exceeds particular thresholds. Typically, earthworks more than 0.25 hectares in area and culverts of more than 900 mm diameter or greater than 20 m in length located in Category 1 watercourses will require resource consents from the ARC.

If a resource consent is needed, then this must be obtained before any work is undertaken, and the conditions of the resource consent must be followed.

Two regional plans are involved: the Regional Plan: Sediment Control (Nov 2001) and the Proposed Regional Plan: Air, Land & Water (Oct 2001). Note that these regional plans may be subject to change and if in doubt, enquire at the ARC on ph **09-366-2000** or fax **09-366-2155**.

Please also note that the comments made above relate only to the Auckland Regional Council. The city and district councils may also have regulatory controls, such as for earthworks, which the forester should be aware of. A resource consent may be required from these councils as well, so the relevant council should also be contacted to determine their regulatory requirements.

2.2 Resource Consent Requirements

An application to the ARC will require the appropriate application form to be filled in, relevant supporting information to be attached, and a deposit fee forwarded. Background information, such as application forms and application costs *etc*, can be obtained from the ARC internet site: <http://www.arc.govt.nz/>

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The fundamental aspect of the supporting information is the erosion and sediment control plan which forms part of the Harvest Management Plan or Harvest Plan (see section 5 of this guideline). The erosion and sediment control plan, along with the supporting text and any necessary calculations, should address the potential effects of the proposed activity, and the various ways in which these may be avoided, remedied or mitigated.

An application for resource consent will involve a combination of technical and statutory matters associated with the Resource Management Act 1991. It is considered good practice to lodge an application early and/or have a pre-application meeting with the ARC as works will not usually be able to commence until the required approvals have been obtained.

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3.0 POTENTIAL IMPACTS OF EARTHWORKS & VEGETATION REMOVAL OPERATIONS

All streams have a natural sediment load that varies primarily with rainfall, geology, topography and land use, both past and current. This natural level of sediment can be greatly increased by earthworks to a level that can result in significant adverse ecological effects. In addition, because of their physical and chemical characteristics, Auckland's clay-rich soils are very difficult to remove once they have become suspended and are easily transported to lower receiving environments (*eg* estuaries).

Poorly managed earthworks and vegetation removal operations can have significant adverse effects on watercourses. There are a number of ways in which these effects may occur, such as:

- The failure to protect disturbed areas from erosion and/or treating runoff from earthworks; as well as effects resulting from mass-movement of soil (slumping) leading to an increased sediment load in watercourses. This is likely to affect water quality and the ability of aquatic life to survive and/or migrate;
- The damage or disturbance of the stream bed and banks during the construction of roads, tracks, culverts or the harvesting of trees. This may result in physical barriers to fish migration;
- The physical disturbance of stream bed and banks from the installation of stream crossings, as well as felling trees into watercourses and dragging trees across or along stream channels. This may result in physical barriers to fish migration.
- An increase in water temperature due to loss of shading from the removal of tree canopy;
- Depletion of oxygen in watercourses as any logging slash that has been deposited in watercourses decays. Barriers to water flows *eg* blocking of culverts from slash;
- Water flow may be affected by changes in vegetation cover impacting upon catchment hydrology. These may create areas of increased erosion potential.

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Photo 3.1 Example of disturbance of the stream bed with debris and sediment from uncontrolled earthworking & harvesting operations

Stream headwaters, where production forestry often occurs, often have high ecological diversity and environmental value due to their relative intactness, compared to more modified lengths of streams and rivers lower down in the catchment. This is not to undervalue the modified stream reaches but illustrate that these headwater areas have a higher level of susceptibility to environmental degradation due to their limited modification. Poorly designed and managed earthworks can directly impact on these values in the upper reaches. Earthworks and harvesting operations therefore need to be well planned to ensure that the risks of erosion and the resultant sedimentation of watercourses is managed and the effects minimised.

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4.0 EROSION & SEDIMENT CONTROL PRINCIPLES

There are a number of erosion and sediment control principles that need to be adhered to. Fundamentally, they can be summed up as:

- Minimise the area of disturbed land (*i.e.* minimise erosion).
- Treat all runoff from earthwork operations before it is discharged so that sediment is retained on site (*i.e.* maximise sediment retention).
- Erosion and sediment control measures are sized for the total contributing catchment, not just the 'worked' area. When a work site is partially stabilised, such as stacked logs and slash on a landing, check that the unstabilised part such as the processing area remains fully controlled by sediment control measures unless it discharges to a different outlet.
- Optimise the location of any infrastructure to ensure the layout will: minimise and simplify any construction; avoid unnecessary stream crossings; and provide the simplest harvest solution which helps reduce the environmental risk.
- Time any operations to minimise any risk. Consider not only the construction of any infrastructure but also the harvesting to ensure the work is completed in an appropriate season or the work is phased to ensure risk areas are completed in the best weather window.

In giving effect to these principles, the forester needs to consider forward planning, erosion and sediment control measures and practices, and monitoring and maintenance. Each of these are briefly discussed in the following sections.

4.1 Forward Planning

Forward planning is essential to achieve good erosion and sediment control outcomes and should form part of the harvest plan (see Section 5). Consideration of how erosion and sediment controls will be achieved during each phase of the operation should form part of the planning for any harvesting operation, and be specifically defined in the harvest plan. Although the exact location of control measures may be difficult to detail in advance, it is essential that provision for erosion and sediment control measures be included for all earthwork/disturbed areas.

This guideline contains a range of erosion and sediment control measures that will help minimise sediment derived from forestry operations. These measures are covered in detail in Sections 6 and 7 with summaries outlined in the Operators Field Guide. It is important to emphasise that erosion and sediment controls need to be installed before the ground is disturbed, regularly maintained during their use, and only removed once that disturbed area is stabilised.

Forest operations are often split into several distinct operations:

1. Planning (salvage, construction, harvest, distribution). May require preparation of resource consent applications;
2. Salvage of road lines;

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3. Construction of roads and landings;
4. Harvesting operations (including construction of haul tracks and temporary crossings);
5. Post harvest rehabilitation.

It is typical to have many operations occurring at the same time which can be spread out over lengthy time frames, and therefore it is important to ensure the integration between all four stages. The planning stage is where the erosion and sediment control measures for each subsequent phase are determined. As well as which measures will be installed where, the harvest plan should clearly identify who is responsible for the implementation of those measures as well as their maintenance. When and how any constructed measure is to be decommissioned should also be set out in the harvest plan. Clear lines of responsibility, a “sense of ownership” will ensure the measures are correctly implemented and the outcomes achieved.

4.2 Erosion Control

Erosion control acts by minimising erosion. This reduces and may eliminate the need to rely on sediment control measures to ensure that any operation causes minimal sediment generation. Erosion control should be the first consideration for any disturbed area as it enables the sediment control measures to operate more effectively. Moreover, good erosion control strategies will have the added advantage of reducing the installation costs of some forms of sediment control and will reduce or minimise the maintenance of structural controls.

The erosion control measures discussed in this guideline consist of planning, runoff control measures and stabilisation, and are expanded upon in Section 6 of this guideline.

4.3 Sediment Control

Sediment control focuses on providing impoundment and/or filtration of sediment-laden flows before discharging the treated flows to the receiving environment. The effectiveness of sediment control measures relies on suitable sizing and construction. Removal of sediment from sediment-laden flows via standing vegetation is generally limited due to the fine-grained nature and consequent mobility of the Auckland soils, and by the lack of close ground cover (a dense grass cover is required). Sediment control measures will not retain all of the sediment generated unless there is no discharge from the measure.

Sediment control measures are discussed in Section 7 of this guideline.

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Photo 4.1 Erosion control rather than sediment control minimises the risk of sediment discharge. In this example, mulching of landing batters has been used to protect the surface from erosion although slash or hay could have been used.

4.4 Monitoring and Maintenance

The monitoring and maintenance of erosion and sediment control measures, especially recently constructed devices, is essential for these controls to continually be effective. The controls on new earthwork areas (*eg* landings and roads) should be checked prior to any forecast rain and following any heavy rainfall events to ensure they are open and working. Once it is confirmed that a structure is working as designed, the need for subsequent checks can be determined on a case by case basis. Any maintenance works identified, such as the removal of accumulated sediment, additional armouring of eroding water tables, or the reapplication of grass seed for example, should be undertaken as soon as possible.

Consideration also needs to be given to post harvesting monitoring and maintenance requirements. Control measures should be checked when operations are complete and replaced, reinstalled, disestablished or maintained to a standard that provides for an appropriate level of erosion and sediment control as the site becomes stabilised. Generally when operations are complete, permanent stabilisation lessens the need for on-going maintenance.

It is important to note that the responsibility for maintenance of these controls does not rest with the ARC. Accordingly, it is expected that the consent holder and/or operator or other authorised personnel will develop a maintenance schedule to ensure that the above factors are met.

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5.0 HARVEST PLANS & EARTHWORK ACTIVITIES

Harvest management plans, often simply called a harvest plan, are primarily designed to set out how an area is to be harvested. Often incorporated within the harvest plan are the earthwork plans defining the construction of the roads, landings and tracks necessary to support the harvesting operation. This part of the harvest plan should outline the strategies and treatment measures required to minimise the generation and discharge of sediment. In preparing the harvest plan, the Planner should identify all the activities that have the potential to generate sediment and create adverse effects, and combine best management practices for these activities with appropriate erosion and sediment control measures.

In the planning of earthworking and harvesting in forestry operations, the harvest plans should identify the following aspects:

- The boundaries/areas covered by the operation.
- Topographical features and/or contours.
- The existing and proposed roading network (and proposed final surface eg metal or clay).
- Watercourses, stream crossings and their locations.
- Earthworks activities, including landings, roads and tracks, and their extent and location.
- Streamside/riparian/wetland management areas and protection measures.
- Other features that need to be considered (archaeological sites, reserves, public roads, electricity pylons, etc).
- Harvesting methods (ground-based or cable, haul directions, processing areas, the type and tower height of haulers and therefore their ability to lift trees over streams etc). The focus of this is to minimise soil disturbance and any adverse effect on riparian areas.
- The types and locations of erosion and sediment control measures. This should address all the design issues including any required calculations.
- How the erosion and sediment control measures will be maintained (timing, access, sediment storage areas etc).
- Methodology for cleaning debris from perennial streams. The harvest plan should be designed to minimise trees being felled across streams because of the disturbance created by the activity. Manual stream cleaning is also a difficult and time consuming operation.
- Post harvesting management including stabilisation of bare earthworked areas, landings management and maintenance of control measures.
- Personnel responsible for the installation and maintenance of the erosion and sediment control measures.

Note: The information outlined above will need to accompany any earthworks or streamworks resource consent application submitted to the ARC.