

PART A INTRODUCTION

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1 About this guideline

1.1 Aims of the guideline

This guideline aims to provide information on how to minimise adverse environmental effects on waterways of surface erosion and the resulting discharge of sediment from earthworks by:

- promoting understanding of the principles of erosion and sediment control as they specifically apply to Canterbury's landforms, soils and climate;
- providing users with a comprehensive set of erosion and sediment control practices and procedures; and
- guiding users on how to use these practices and procedures during project design, construction, operation, maintenance and decommissioning.

This guideline is not a statutory document. It is a living document that will be reviewed and updated as new knowledge and technology become available.

1.2 Scope of the guideline: what's in it and what's not

The practices and procedures in this guideline apply to erosion and sediment control from temporary land-disturbing and vegetation removal activities associated with:

- residential or commercial subdivisions and the development of industrial estates;
- large-scale roading;
- development of tracking for forestry or agriculture;
- quarries;
- cleanfills and landfills; and
- related works, including stream works, installation of utility services and housing construction on individual small sites.

This guideline is not intended to:

- control erosion and sedimentation associated with agricultural cultivation, other rural land uses or forestry harvesting: people undertaking these activities should refer to industry guidelines that outline the specialised controls needed for these activities;
- include specialised controls needed for mass movement, stream bank or coastal erosion: people needing help with those forms of erosion should seek information from geotechnical specialists. While inadequate erosion and sediment control practices may trigger slope failure (mass movement) on vulnerable lands such as the steep loess slopes on Banks Peninsula, their intelligent and conscientious use should avoid this. **The presence of severe erosion of these types may indicate that a site is unsuitable for development, but this guideline does not address such geotechnical matters, which are the province of the land use planning and consenting process;**
- address matters relating to pumping or diversion of groundwater (apart from observing that groundwater should be disposed of into the same catchment from which it is removed); or
- control the management of stormwater or groundwater from developed areas and the naturalisation of existing urban waterways. The banks and beds of ephemeral and perennial watercourses are vulnerable to increased erosion from both the earthworks phase and the completed urbanisation of the catchment and its subsequent hydrological changes. For more information on that topic, Canterbury users should refer to the

Christchurch City Council Waterways, wetlands and drainage guide (2003) and the NZWERF On-site Stormwater Management Guideline (2004) listed in the references.

The guideline applies throughout Canterbury, and recommendations for use of various measures reflect the variety of soils and landforms in the region and their associated environmental risks. A comprehensive set of erosion and sediment control practices and their design, construction, operation, maintenance and decommissioning is in Part B of this guideline.

Section 5 gives some guidance on how to use these practices separately and together by assessing each site and its management in the over-all context of Canterbury's landforms, soils and climate.

1.3 The need for the guideline

Deposition of fine sediment in Canterbury's lowland streams has adversely affected water quality and ecosystem health.

During rainfall events, runoff from recently disturbed sites entrains considerably higher concentrations of suspended solids than from vegetated or impervious land. More of the sediments from disturbed sites are fine particles that are more damaging in the receiving environment. Furthermore, the slow velocities of lowland streams means that sediment settles out onto the stream bed relatively quickly and takes a long time to move downstream and out of the system. Even short duration discharges of high silt loads can have long-term detrimental impacts. Based on observations of many of Canterbury's urban streams, the rate of sediment input has exceeded the rate of export, thus resulting in siltation of stream beds.

Impacts of sediment input to streams, lakes, estuaries and other water bodies includes:

- biological effects, including:
 - smothering of plants;
 - abrasion and possible death of stream insects such as stoneflies and mayflies that fish eat, as well as the fish themselves;
 - smothering stream-bed gravels inhabited by insects and used by fish for spawning;
 - reduced light levels; and
 - excessive siltation of stream beds encouraging weed growth and providing a source for ongoing suspension of fine sediment, resulting in permanently turbid water;
- blocked channels, which cause:
 - reduced hydraulic efficiency and increased flood risk;
 - risk of environmental damage from remedial works;
- effects on water users for irrigation, stock and domestic water supplies, as well as filling of dams;
- amenity effects, including aesthetic and recreational values;
- damage to property and public utilities from sediment settling out on property or in pipes; and
- effects on matters of significance to tangata whenua, including:
 - water quality and the mauri of waters, for example fishery values;
 - customary rights;
 - kaitiaki initiatives and responsibilities.

As shown in Figure 1.1, sediment is a highly visible pollutant which adversely affects the cultural, aesthetic and recreational values of waterways. Growing environmental awareness and expectations mean the community now demands that the construction industry take a more responsible and proactive approach to environmental management.

This guideline aims to help the industry meet legislative and community expectations by protecting waterways from the adverse effects of earthworks.

1.4 How the guideline was developed

This guideline was developed by assessing existing erosion and sediment control guidelines to select a core group of erosion and sediment control practices that would provide the best local relevance and completeness for the Canterbury region. Drawing on councils, consultants and contractors' local knowledge of the Canterbury environment, together with the authors' combined 50-odd years of experience on operational earthworks sites, these practices were adapted for use in Canterbury. This work involved considerable synthesis and adaptation based on professional judgement, and in keeping with the style of other guidelines and in order to avoid repetitive referencing in the practices themselves (which are working documents for use on earthworks sites), it was considered that an integrated reference list was a more accurate reflection of the research done. Accordingly, the source guidelines used are listed in Part D.

Figure 1.1 Effects of sediment on receiving environments

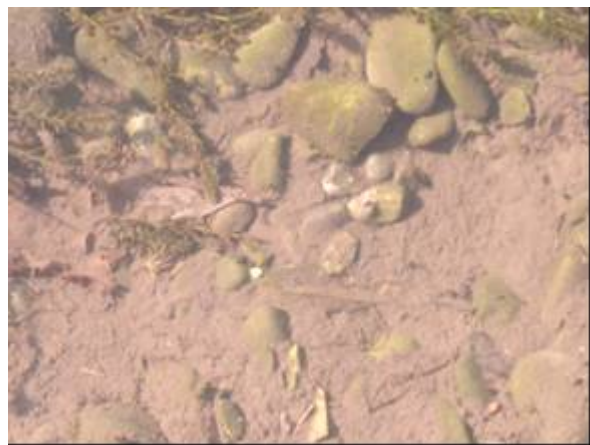
Source Environment Canterbury



Lack of erosion and sediment controls on earthworks has major environmental impacts downstream. The right-hand image shows the sediment plume 1.8km below the discharge and 2.4km below where the machinery was working in the image on the left.



Healthy aquatic plants should be bright green, as in the left-hand photo. The plants in the photo on the right are covered in fine sediment. Fine sediment coats and suffocates aquatic plants, reducing food sources and habitat for stream life. If such inputs continue over long periods of time, desirable plants and animals die off or move on, changing the whole ecology of the stream.



Clean gravels like those in the left-hand photo are very important for healthy streams, with many aquatic species laying eggs and reproducing in them. Fine sediment clogs gravels as shown in the right-hand photo, reducing the circulation of oxygen-rich water to stream insects and around fish eggs, greatly reducing survival rates.

1.5 Benefits of good erosion and sediment control

Good erosion and sediment control is good business and good engineering practice. A little extra effort reduces environmental risk and liability and the results are easy to see. The following benefits and cost savings of good erosion and sediment control have been demonstrated many times on projects in other parts of New Zealand and throughout the world:

- **protection of site assets and reduced maintenance costs:** good erosion and sediment controls minimise damage from uncontrolled water flows to areas such as cut and fill slopes; partially formed roads, verges, shoulders and table drains; abutments and bridge foundations; gully pits, field inlets, culverts and pipes;
- **reduced downtime and construction delays:** good erosion and sediment control means less time, resources and money spent on repair, rework or clean-up of damaged areas. Keeping sediment out of drains and culverts maintains their hydraulic capacity and improves site and public safety;
- **commercial and community benefits:** erosion and sediment control enhances the credibility and reputation of both contractor and principal, with fewer public complaints about dust and mud on roads and in streams; reduced potential for fines and/or litigation and reduced compliance costs;
- **effective environmental protection:** protection of soil resources means reduced sediment deposition, turbidity, nutrient enrichment and general contamination of water bodies; less damage to aquatic, estuarine and riparian ecosystems; preservation of habitat and maintenance of biodiversity;
- **community benefits:** maintenance of capacity in drainage facilities and watercourses reduces flood potential; maximises storage capacity in reservoirs and water supply dams and results in a reduction in water treatment costs, improving visual and recreational amenity values.

Effective erosion and sediment control protects work sites and community assets and infrastructure, as well as Canterbury's highly valued and unique natural environment – a win for everyone.

1.6 Regulatory framework for earthworks and associated sediment discharges in Canterbury

There is ample case law from all around New Zealand to demonstrate that sediment from earthwork sites is a potential environmental pollutant. The Resource Management Act 1991 (RMA) makes every person responsible for ensuring their activities and those of their employees do not contribute to pollution of our environment.

Regional and district councils have specific functions under the RMA to manage land use and discharges in order to maintain water quality and to protect important in-stream habitat and biodiversity values. Specifically, section 15 of the RMA states that it is illegal to allow any contaminant – including sediment – to enter water either directly, through the stormwater system or via the contamination of land, unless it has been expressly authorised by a regional rule or a resource consent.

The broad planning framework for managing resources in Canterbury is set out in Environment Canterbury's Regional Policy Statement. More specific and directly enforceable regional plans relating to controls on activities likely to take place during earthworks include:

- The Land and Vegetation Management Regional Plans for Kaikoura East Coast (Part I) and the Port Hills (Part II), addressing the management of earthworks and vegetation clearance.
- The Proposed Natural Resources Regional Plan (NRRP) – Chapters 4: Water Quality and 8: Soil Conservation.
- The Transitional Regional Plan for Canterbury.
- The Transitional Regional Plan for the Nelson-Marlborough Region as it applies within the Kaikoura District – incorporating Plan Changes 1 & 2.

These plans can be found on the Environment Canterbury website.

The city and district councils in the region also have rules relating to earthworks and stream works, and these are set out in the relevant district plans.

Together, these regional, city and district council documents set out which earthworks and discharge activities are:

- **permitted activities**, for which a consent application is not required, but for which all specified conditions in the rules must be met. If these conditions cannot be met, than a resource consent is required;
- **controlled, discretionary, and non-complying** activities for which a resource consent application is needed, especially for discharges (water quality and quantity) and vegetation removal.

1.6.1 Permitted activities and the erosion and sediment control guideline

Although permitted activities do not need a resource consent, they must nevertheless meet all the relevant conditions of the rules set out in the relevant regional and/or district plan.

For earthworks and vegetation removal, Environment Canterbury rules are detailed in the Land and Vegetation Management Regional Plan and Transitional Regional Plan. Chapter 4, Water Quality, of the Proposed NRRP also contains rules relating to discharges of contaminants and vegetation clearance and soil disturbance along riparian margins. Chapter 8, Soil Conservation, of the Proposed NRRP outlines Environment Canterbury's policies and objectives for soil conservation, but does not contain rules.

City and district councils in the region also have various permitted activity conditions for vegetation removal, soil disturbance and excavations.

Some of the practices and procedures in this guideline will help people who are carrying out permitted activities to meet the environmental performance requirements of permitted activities.

1.6.2 Resource consent applications and the erosion and sediment control guideline

Where the earthworks associated with a development do not comply with conditions in permitted activity rules under the relevant plans, a land use, earthworks and/or a discharge consent will be required from Environment Canterbury and/or the relevant city or district council.

Schedule 4 of the RMA requires consent applicants to prepare an assessment of environmental effects (AEE). These requirements are set out clearly in regional and district plans, and applicants should refer to these plans for guidance.

For Environment Canterbury consent applicants, Chapter 1, section 1.3.4 of the Proposed NRRP outlines the procedures for applying for a resource consent from Environment Canterbury, while Chapter 4, section 4.7 of the Proposed NRRP describes particular information that is required in order to audit a resource consent application made under the rules in that chapter.

This guideline will help consent applicants to prepare an erosion and sediment control plan to meet these RMA requirements and the conditions attached to any granted resource consents.

Typical conditions for earthworks and related consents include:

- a requirement to take all practicable measures during construction to minimise discharges off site and to water;
- an erosion and sediment control plan condition requiring the consent holder to undertake specific mitigation measures; and
- a requirement to design, build, operate, maintain and decommission the relevant works associated with the development, generally in accordance with the erosion and sediment control guideline.

This guideline does not traverse the requirements under legislation other than the Resource Management Act, or set out the policy, plan or resource consent requirements for earthworks and associated discharges of contaminants off site. Users of the guideline are referred to the websites and customer service centres of Environment Canterbury (www.ecan.govt.nz or 0800 EC INFO) and the city and district councils in the region for more information.

Table 1.1 Contact details for local authorities in the Canterbury region

Regional Authority	Contacts
Environment Canterbury	Phone: 0800 324 636 Email: ecinfo@ecan.govt.nz Website: www.ecan.govt.nz
Local Authority	
Kaikoura District Council	Phone: (03) 319 5026 Email: kdc@kaikoura.govt.nz Website: www.kaikoura.govt.nz
Hurunui District Council	Phone: (03) 314 8816 Email: info@hurunui.govt.nz Website: www.hurunui.govt.nz
Waimakariri District Council	Phone: (03) 313 6136 Email: office@wmk.govt.nz Website: www.wmk.govt.nz
Christchurch City Council	Phone: (03) 941 8999 Email: info@ccc.govt.nz Website: www.ccc.govt.nz
Selwyn District Council	Phone: (03) 324 8080 or (03) 318 8338 Email: admin@selwyn.govt.nz Website: www.selwyn.govt.nz

Ashburton District Council	Phone: (03) 307 7700 Email: info@ashburtondc.govt.nz Website: www.ashburtondc.govt.nz
Timaru District Council	Phone: (03) 687 7200 Email: enquiry@timdc.govt.nz Website: www.timaru.govt.nz
Mackenzie District Council	Phone: (03) 685 8514 or 0800 685 8514 Email: info@mackenzie.govt.nz Website: www.mackenzie.govt.nz
Waimate District Council	Phone: (03) 689 8079 Email: brent@waimatedc.govt.nz or andrew@waimatedc.govt.nz Website: www.waimatedc.govt.nz
Waitaki District Council	Phone: (03) 434 8060 or 0800 108 081 (within the district) Email: csunit@waitaki.govt.nz Website: www.waitaki.govt.nz