Forest Practice Guide

Non-Regulatory

Erosion and Sediment Control Measures 2.1 Water Tables

A *water table* is a drain to channel and direct stormwater from cut banks or *berms* along a road or at a *landing* to an appropriate discharge point. A *water table* collects stormwater from across the road surface. This keeps the road subgrade drier, making a stronger road.

Stormwater needs to be regularly discharged from *water tables* to minimise scour. To help reduce scour, *water tables* can be rock armoured. *Sediment* traps and *check dams* can also assist in reducing water speed and its erosive power.

Water tables are one of a family of stormwater control measures that increase the life of a road or *landing* by reducing erosion and maintenance costs. They also reduce the likelihood of *sediment* delivery to *rivers*.

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Erosion and Sediment Control Measures
2.1 Water Tables

A Where and when to use

1. Use *water tables* on all roads and to drain *landings* (where stormwater needs to be diverted away from the *landing*).

B Where not to use

Not applicable for this FPG.

C Design

1. Stormwater needs to be regularly discharged from water tables to reduce quantity and velocity.
2. Ensure the road has adequate cross fall so that stormwater drains off the carriageway into the *water table* drains.

D Construction

1. Construct *water tables* to an adequate depth.
2. Construct the bottom of the *water table* as flat as possible. "V" shaped *water tables* are more prone to erosion as the water is more concentrated.
3. Construct *water table* outlet control measures (i.e. *culverts* and *flumes*) at the same time as the *water tables* to minimise scour.

Rock armouring

4. Consider using rock armouring:
    a. Where the *culvert* or *cut-out* spacing distance is restricted by the terrain.
    b. In steep gradient *water tables* if concentrated water flow and potential *culvert* failure could lead to significant adverse environmental risk and infrastructure failure.
5. Rock armouring is placing larger aggregate (preferably fractured to avoid rolling) in the *water table.* This slows water flow and limits erosion, as the rock protects the *water table* by reducing the energy of the water.
6. Standard road aggregate can be used by applying it to the full width of the road, not just the driving surface.
7. Ensure the aggregate is both large enough and placed deep enough to take stormwater flow. This avoids aggregate being displaced or washed into *culverts* and blocking or partially blocking them.
8. *Compact* the *water table* aggregate, if possible.
9. If standard road aggregate is not suitable for lining the *water table*, use a different aggregate after the subgrade aggregate is applied to the road surface.

Water table with road base course used for rock armouring.

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D Construction continued

Check dams

10. Consider using *check dams* (very small temporary or semi-permanent dams constructed across a *water table*), where *water tables* are prone to erosion, primarily due to water speed with a large volume flow. They may be used in tandem with rock armour.
11. Use larger aggregate or sand bags filled with aggregate.
12. Ensure water goes over the middle of the *check dam* and not around the edges, otherwise this will lead to scour.
13. Do not form *check dams* higher or wider than the *water table* itself.

Water table check dams.

Polymers

14. Polymers can be applied to *water table* drains to lock the soil particles together and therefore prevent drainage water from eroding the *water table* surface. www.rst.co.nz/soil-stabilisers.html or www.vitalindustries.com.au.

E Maintenance

1. Prepare a routine maintenance plan including heavy rainfall response measures.
2. Maintain *water tables*. They can require regular maintenance due to cut bank slumping which can disrupt their drainage pathway.
3. Check them after a heavy rain event.
4. Ensure sufficient road drainage *culvert* spacing and cut-outs to control the stormwater *run-off*. If not, either construct additional *culverts* or *cut-outs* to reduce *water table* erosion, or build rock armour *check dams* or apply polymers in areas that drain to highly sensitive receiving areas.

F Other methods

These are complementary measures: *berms*, *cut-outs*, road drainage *culverts* and *flumes*.

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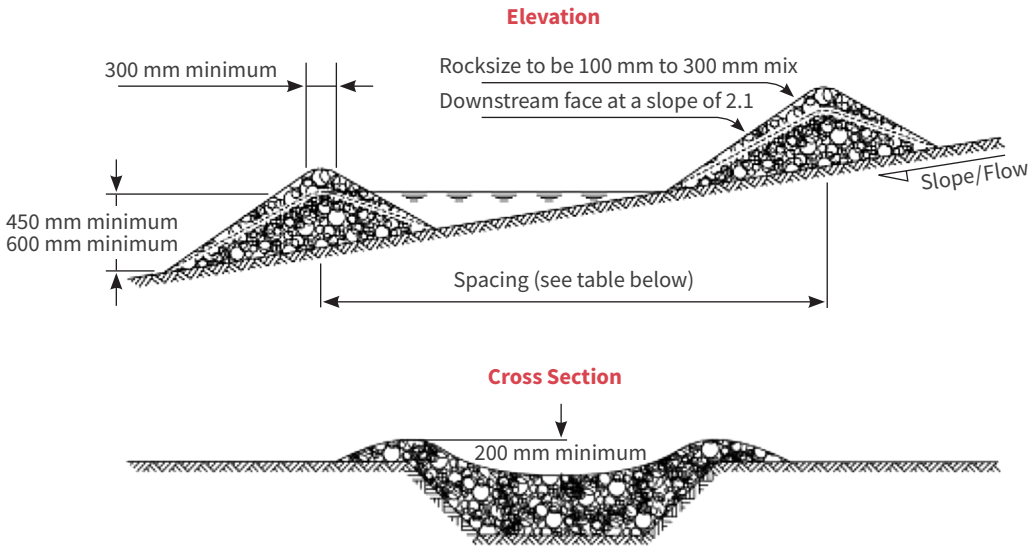
G Technical specification guidelines

1. The lowest point of the *water table* should be below subgrade level, about 500 mm below the crown of the road.
2. *Check dam*:

Rock check dam diagram



Slope	Spacing (m) between dams (450 mm centre height)	Spacing (m) between dams (600 mm centre height)
2% or less	24	30
2% to 4%	12	15
4% to 7%	8	11
7% to 10%	5	6
over 10%	Use stabilised channel	Use stabilised channel

National Environmental Standards for Plantation Forestry

Relevant regulations for *sedimentation* are 26, 27, 31, 33, 56.

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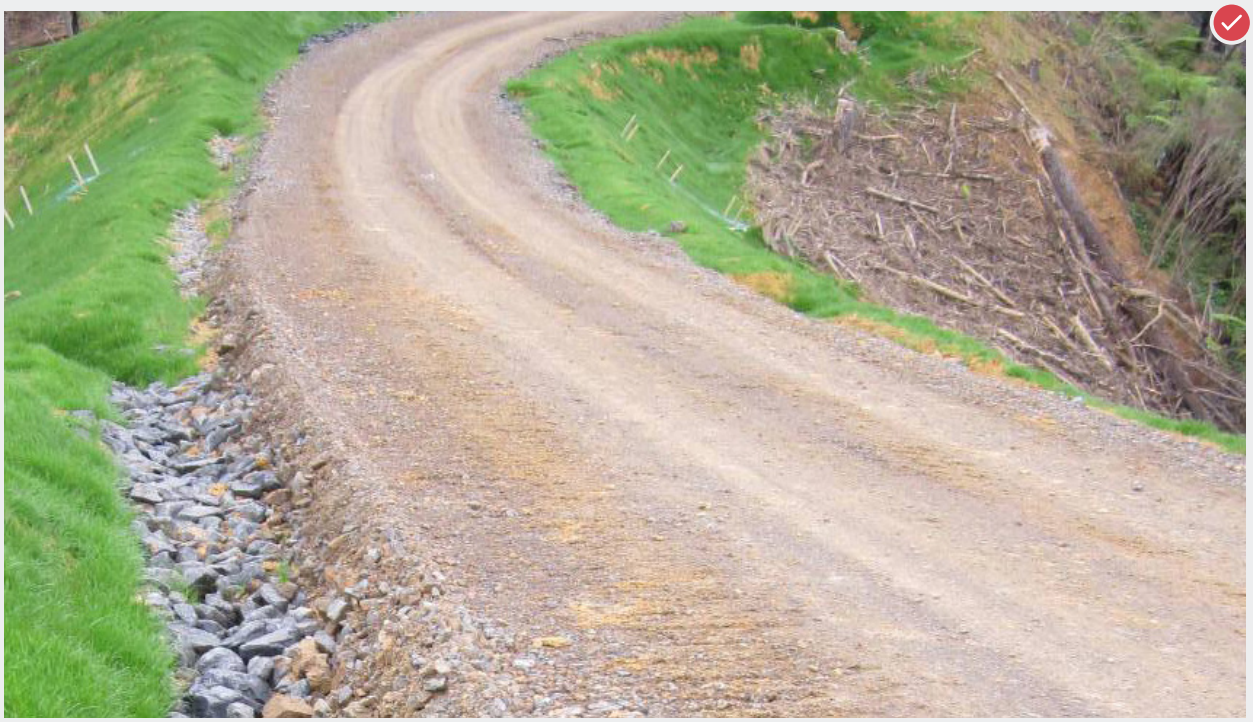
Examples

A *water table* with a high flow of stormwater.

Scoured road edge after the *water table* was blocked by a slump from the cut *batter*.

Erosion and Sediment Control Measures
2.1 Water Tables



Angular rock armoured *water table*.

Contact

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