Sustainable drainage management

Best management practice

By Henry R Hudson

3 Channel excavation

Complexity	Environmental value	Cost
Low Moderate High	Low Moderate High	Low Moderate High

Definition & purpose

Channel excavation to restore the hydraulic capacity of drains which are obstructed by sediment deposits and weeds.

Location

Places where there are obstructions (sediment, weed, debris) impeding drainage. This might be a single location (e.g. local bed build up) or an extensive reach of drain.

Channel excavation work carried out from the side where the least disturbance will be caused.

Work window

- Arrange access in consultation with landowners to avoid disruption of farming operations.
- If there is significant habitat value schedule work to avoid adverse effects (e.g. fish migration, spawning, nesting).
- Drains are often good eel habitat. Eels hibernate in June so avoid drain cleaning then.

Treatment objectives

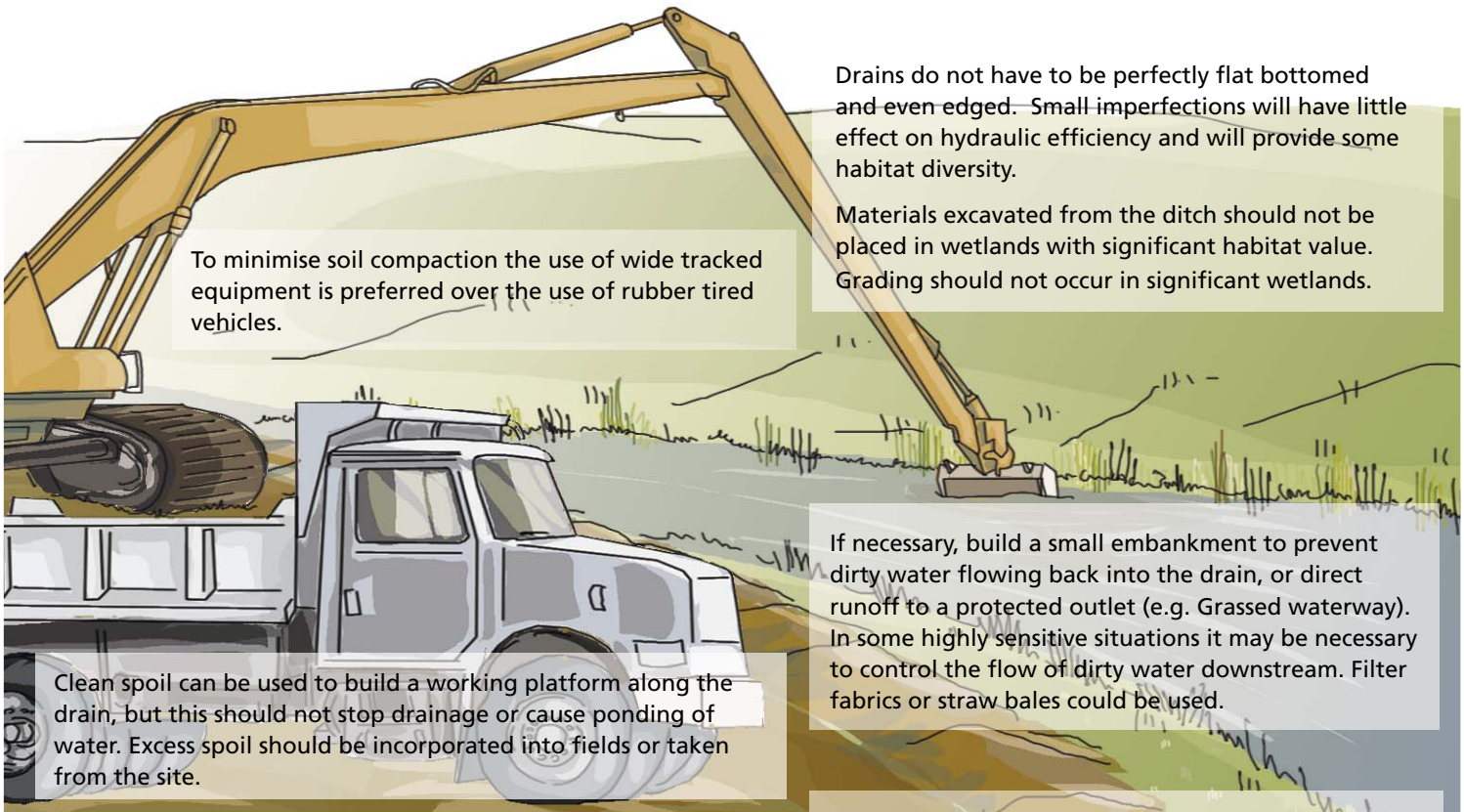
1. Re-establish the drainage outfall required for the drain and its feeder drains (e.g. side drains and field tiles) by removing only the obstructions. The channel should not be enlarged.
2. Provide the required outfall and water-table levels for agricultural productivity and access (e.g. lower the water-table 25-30 cm below the surface within 24 hours, and 30-45 cm below the surface within 48 hours after rainfall).
3. Minimise disturbance, avoid sensitive areas (e.g. patches of native vegetation), and rehabilitate disturbed land (e.g. smooth spoil heaps; reseed exposed soil) particularly if erosion is likely to occur.
4. If eels or other fish are dug out, return them to the channel.

Before you start

- ☐ Check if there is an outfall problem, or just the perception there is a problem.
- ☐ Assess if excavation is the most effective means of obtaining outfall (e.g. would hand removal of small blockages achieve outfall; would spraying be more effective?).
- ☐ Consult with District/Regional Council staff and landowners about habitat value, and the requirements for avoiding sensitive times and places.
- ☐ Obtain necessary approvals from the local authority.

Procedures

Work from one bank if possible to minimise land disturbance. If there is a choice of banks, use the side that will have the least disturbance and maximise preservation of stream shading.



To minimise soil compaction the use of wide tracked equipment is preferred over the use of rubber tired vehicles.

Drains do not have to be perfectly flat bottomed and even edged. Small imperfections will have little effect on hydraulic efficiency and will provide some habitat diversity.

Materials excavated from the ditch should not be placed in wetlands with significant habitat value. Grading should not occur in significant wetlands.

If necessary, build a small embankment to prevent dirty water flowing back into the drain, or direct runoff to a protected outlet (e.g. Grassed waterway). In some highly sensitive situations it may be necessary to control the flow of dirty water downstream. Filter fabrics or straw bales could be used.

Clean spoil can be used to build a working platform along the drain, but this should not stop drainage or cause ponding of water. Excess spoil should be incorporated into fields or taken from the site.

Minimise disturbance of the banks. Try and retain vegetation for erosion protection. Native vegetation should be preserved to the maximum extent possible.

Do not over-dig the channel because outfall in the rest of the system might change. Separate resource consent is required for channel modifications.

Exposed soils that are prone to surface wash erosion and channel erosion should be seeded or planted (see the Streamside planting guide).

Stabilise banks if necessary. This may require re-battering (re-shaping) of banks in which case resource consent is required. If vegetation is used to stabilise banks, ensure that there will be access to the drain for future maintenance.

Evaluate if other measures could be taken to prevent future problems (e.g. could upstream inputs of sediment be controlled by better land management, grassed waterways or filter strips along the drain?).

Access corridors should be left in the best condition feasible, consistent with maintenance requirements and adjacent land use.

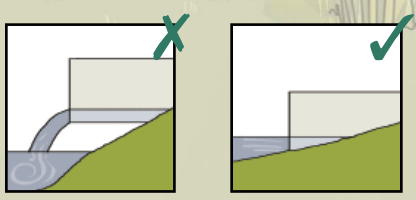
If the drain is to be fenced, ensure that there will be access to the drain for future maintenance.

Culvert replacement/repair should always be carried out with the culvert invert being the lesser of either:

- One third of the culvert diameter or:

- 300 mm below the existing bed level.

The culvert should be laid at the same gradient as the reach where the culvert is to be located. There should be no problems with fish passage or bed scouring below the culvert if this is done.



Additional reading

Hudson, H.R.; editor. 2005. *H20-DSS Hillslopes to Oceans: a Decision Support System for sustainable drainage management.* New Zealand Water Environment Research Foundation, Wellington, New Zealand:

www.nzwerf.org.nz

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