

Soil Conservation Earthwork Specification

Department Primary Industries June 2005

General Requirements

The contractor must ensure all works undertaken on the construction site comply with current occupational health and safety legislation.

The contractor must ensure all appropriate permits & licenses have been obtained prior to commencing construction works.

The contractor must ensure that appropriate plant and machinery hygiene strategies are implemented to minimise the spread of weeds, diseases or pathogens.

All disturbed areas are to be topsoiled and sown to an approved perennial pasture and fertiliser mixture on completion of earthworks.

No grazing of disturbed areas is to be permitted, until a good cover of perennial pasture has been established.

1. Dam Construction (*Large dams)

The bank volume shown on plan is the compacted volume of the dam wall; not the loose soil volume. It does not make allowance for the extra work involved in preparing the site, removal and replacing of topsoil and handling of overburden.

There is a high rate of failure with these works. It is critical that the area beneath the dam bank be carefully prepared to ensure a good bond between the bank and parent material. Soil material must be inspected and approved by an NRE Officer prior to being used in the dam bank. Vegetation, topsoil and overburden is to be stored away from the construction site to avoid contamination of the dam wall.

Construction works are to be carried out in the order and to the specifications described below:

- Trees, fallen timber and other debris are to be cleared and removed from under the dam bank and from approved borrow areas.
- All topsoil from under the dam bank, from below full supply level and from approved borrow areas is to be removed and stockpiled.
- Creek/gully edges beneath the dam bank are to be battered off to a slope not steeper than 3 horizontal to 1 vertical. This is to allow for easy access and exit of construction equipment and to ensure adequate bonding of the dam bank to the parent material.
- Overburden from beneath the dam bank is to be removed until firm clay or bedrock has been exposed.
- A core trench, at least 0.9m deep is to be excavated into impermeable, stable foundation material consisting of either clay or bedrock.
- The stripped area under the bank is to be lightly scarifying to a depth not exceeding 100 millimetres.
- The core trench and dam foundations are to be inspected and approved by an NRE Officer prior to commencing bank construction.
- The core must be centrally placed and extend for the full length and height of the bank.
- Bank material is to be placed in layers no thicker than 150mm, each layer is to receive a minimum of 6 passes of a vibrating sheepsfoot roller.
- Prior to placement, bank material must be watered until it is within 3% of optimum moisture content.
- Each layer is to be compacted until a density equivalent to or greater than 85% Proctor Maximum is achieved. Random compaction testing will be carried out during dam construction

- The completed bank should be built 5% higher than specified to allow for settlement. The top of the bank should be rounded to avoiding ponding of surface water.
- Prior to the replacement of topsoil, the bank is to be inspected and levels checked by an NRE officer.
- Upon completion, all disturbed areas above full supply level are to be battered off to a slope not exceeding 3 horizontal to 1 vertical, topsoiled and left with a smooth, even profile.

2. Dam Construction (*Small dams)

The bank volume shown on plan is the compacted volume of the dam wall; not the loose soil volume. It does not make allowance for the extra work involved in preparing the site, removal and replacing of topsoil and handling of overburden.

There is a high rate of failure with these works. It is critical that the area beneath the dam bank be carefully prepared to ensure a good bond between the bank and parent material. Vegetation, topsoil and overburden is to be stored away from the construction site to avoid contamination of the dam wall.

Construction works are to be carried out in the order and to the specifications described below:

- Trees, fallen timber and other debris are to be cleared and removed from under the dam bank and from approved borrow areas.
- All topsoil from under the dam bank, from below full supply level and from approved borrow areas is to be removed and stockpiled.
- Creek/gully edges beneath the dam bank are to be battered off to a slope not steeper than 3 horizontal to 1 vertical. This is to allow for easy access and exit of construction equipment and to ensure adequate bonding of the dam bank to the parent material.
- Overburden from beneath the dam bank is to be removed until firm clay or bedrock has been exposed.
- A core trench, at least 0.6m deep is to be excavated into impermeable, stable foundation material consisting of either clay or bedrock.
- The stripped area under the bank is to be lightly scarifying to a depth not exceeding 100 millimetres.
- The core must be centrally placed and extend for the full length and height of the bank.
- Material to be used in the bank must be moist, have a minimum clay content of 20% and be free from organic matter, topsoil, and excessive quantities of silt, sand or gravel.
- Material to be used in the core must be watered until it is within 10% of optimum moisture content.
- Bank material is to be placed in layers no thicker than 150mm, each layer is to receive a minimum of 6 passes of a vibrating sheep's foot roller, wheeled scraper or similar compaction implement.
- The completed bank should be built 5% higher than specified to allow for settlement. The top of the bank should be rounded to avoiding ponding of surface water.
- Prior to the replacement of topsoil, the bank is to be inspected and levels checked by an NRE officer.
- Upon completion, all disturbed areas above full supply level are to be battered off to a slope not exceeding 3 horizontal to 1 vertical, topsoiled and left with a smooth, even profile.

2. Gully Battering

- Due to the shortage of topsoil, it is critical that all topsoil is removed, stockpiled and replaced upon completion of work.
- An excavator is to be used to strip topsoil away from the gully edges and from between individual gully channels.
- A minimum of 95% of the topsoil to a depth of 150mm is to be removed from all areas to be battered.
- Upon completion the battered gully will have a parabolic or trapezoidal cross section with a base width no less than 2 metres wide and batters not exceeding a slope of 5 horizontal to 1 vertical.
- The completed surface must smooth, even and free draining. All impermeable surfaces should be deep ripped prior to replacing topsoil.
- The use of a motor grader to complete final levelling and spreading of topsoil is strongly recommended.
- All disturbed areas are to be topsoiled.

3. Gully Edging

- Edging is to be carried out using an excavator.
- 95% of topsoil to a depth of 150mm is to be stripped, stockpiled and replaced upon completion of work.
- Edging is to be carried out from both sides of the gully to avoid disturbing the stream bed/channel.
- A minimum bed width of 3 metres is to be maintained for the entire length of the work.
- Any loose material falling in the channel is to be removed.
- Gully edging is to be finished off to a batter slope not exceeding 3 horizontal to 1 vertical and must be left with a smooth even surface.
- All disturbed areas are to be topsoiled.

4. Diversion/Trainer Bank Construction

- Banks are to be built to specifications shown on the site plan, and as shown on the attached standard plan for diversion banks.
- Crossed pegs indicate the start and finish of each bank and the location of the spill section. All pegs are on the upstream side of the bank.
- Prior to construction all topsoil is to be removed from beneath the bank and from the borrow area. Topsoil is to be replaced over all disturbed areas once the bank is complete.
- Banks are to be constructed using moist clay and should be thoroughly compacted during construction.
- The banks should have a batter slope no steeper than 2.5 horizontal to 1 vertical and a crest width of at least 0.3m.
- Channels on cut and fill banks should have a level cross-section and be at least 2.5m wide.
- While the banks can be initially constructed with a bulldozer or scraper, finishing work must be carried out using a motor grader.
- The grade on completed diversion banks must be within 0.5% of surveyed/pegged grade.

* For the purposes of this specification, "Large dams" are those with an embankment height greater than 5m or a compacted embankment volume greater than 1,500m³