



Lined effluent ponds meet compliance needs

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THE growth of dairy in New Zealand, coupled with more regulations requiring environmentally friendly effluent management, means lined effluent ponds are becoming commonplace to help farmers achieve compliance.

This is especially so given that councils are promoting greater storage capacity ponds, with 30-90 days now common.

Artificial geomembranes are the most cost effective way of achieving large volume storage capacity, and later use this effluent as a valuable nutrient source.

There are two major types of lining membranes available in New Zealand considered suitable for this commercial application, each with its pros and cons.

Farmers should do their homework when exploring their lining options, and need to ask questions and insist on written confirmation of what they are promised.

There are many general "liners" on the market, but not all can be considered fit for the purpose.

Farmers are increasingly looking at future proofing, and should therefore check on the warranty period and who holds the warranty for UV breakdown etc. They should also look at maintenance – how and who repairs the product should it become damaged?

Liners can be provided for new or existing dairies which require a new pond, or to line an existing pond. There are a number of different pond systems being promoted in different parts of the country, the most prevalent being:

- single pond with stirrer
- 2-pond system (aerobic and anaerobic)

Weeping wall sludge bed combined with one holding pond for the "clean", solid free liquid

Each system has its pros and cons, is site specific and therefore should be discussed with your local effluent management specialist or council dairy extension officer/ Fonterra sustainability dept.

Site selection

This should be as close as possible to the dairy shed, with sufficient fall to avoid pumping from shed to pond.

Nature of the subgrade should also be considered since soft and compressible peat is unstable and hard rocky or areas with pumice may require thicker underliner to protect the membrane.

Areas where the groundwater level is higher than the base of the pond should be avoided if possible, if not, then water drainage (draincoil) will need to be installed under the liner to avoid a rising water table lifting the liner.

There are three ways of building a pond:

Fully excavated – entire pond below ground level, lowest cost; water tables can be a problem.

Raised embankment or turkey nest – half below and half above ground level, easier drainage but higher cost; risk of unstable bank.

Semi excavated – compromise of both, medium cost.

Site layout:

The pond base should have a fall of 2% to assist with easy draining and positive gas movement under the liner

Embankment batters or slope are dependent on the underlying sub grade. If no slope stability study has been done, a minimum batter of 2:1 is recommended if the max depth is less than 5m.

The liner must not be used to provide stability to the embankment.

Embankment crest at the top of the slope should have a minimum width of 1m before the anchor trench is dug, to provide enough stability to both the batter and the anchor trench.

Anchor trenches are set 1m back as above, and are a minimum of 400mm wide and 400mm deep in cohesive soils, and vary according to batter, pond size and soil type.

Freeboard of at least 300mm below the top of the pond should be maintained (providing the top of the pond has been built level) since overflowing liquid can compromise batter and anchor trench stability.

Preparation of the supporting surface for the membrane is very important. It should be free of loose rocks, stones and vegetation and needs to be well compacted, prior to laying the liner.

Unless the surface to be lined is perfect, most liner manufacturers recommend the use of a geotextile underliner (similar to carpet underlay) to help protect the lining membrane. Water and gas drainage under the liner are also issues which need to be considered.

Lined ponds have to be treated differently to earth ponds, and some basic precautions should be followed:

Diggers cannot be used to desludge ponds

Third party contractors working in, on or around the lined pond (effluent pumpers/pump and pipe tradesman) must be notified before they commence work that the pond contains an expensive liner which can be damaged.

- Vaughan Podbielski is Cosio Industries Ltd product manager for Firestone EPDM Liners.