

## Effluent storage pond lining options (6-14)

Liners can be formed from compacted clay, concrete or specifically manufactured materials such as polyethylene (PE), polypropylene (PP), or rubber (EPDM). The table below lists the 'pros' and 'cons' of each option.

Options	Pros	Cons
<b>Compacted Clay</b>	<ul style="list-style-type: none"> <li>• May have suitable clay on site for pond construction</li> </ul>	<ul style="list-style-type: none"> <li>• Requires soil testing by a professional</li> <li>• Requires technical expertise to compact clay correctly to achieve sealing requirement</li> <li>• Cracking can appear when ponds are empty, risk of leaking</li> <li>• Warranties may be more difficult to obtain</li> <li>• Potentially high cost if importing clay from off-site</li> <li>• May require periodic re-lining of the pond after cleaning</li> <li>• Not favoured by all councils, you need to check first</li> </ul>
<b>Concrete (Engineered cement composite)</b>	<ul style="list-style-type: none"> <li>• Less earthwork preparation required than with clay liners</li> <li>• Flexible to withstand ground movement</li> <li>• Withstands mechanical damage</li> </ul>	<ul style="list-style-type: none"> <li>• Relatively new product for effluent ponds in New Zealand</li> <li>• Warranties may be difficult to obtain, engineering expertise is essential</li> <li>• Moderate to high cost</li> </ul>
<b>Synthetic Liners</b>	<ul style="list-style-type: none"> <li>• Good range of liners available</li> <li>• Good warranties available</li> <li>• Installation allows for gas and ground water dissipation</li> </ul>	<ul style="list-style-type: none"> <li>• Some variation in quality of synthetics on the market, need to assess questions described below</li> <li>• Moderate to high cost</li> </ul>

The type of liner chosen should be appropriate for the intended purpose and care must be taken during preparation, installation and use. Defects from inappropriate installation can lead to consent non-compliance and the need for remedial work.

**Clay liners** - Clay-lined ponds require stable moisture conditions year-round to prevent "driving wedges" forming. These occur when the pond is empty and the clay dries out and cracks. Once formed, these cracks will always be present and, in time, increase the risk of leaks.

A clay-lined pond should not be aggressively agitated or operated in such a way that the clay lining is compromised.

**Synthetic liners** - There are some very good synthetic lining options in the market, but there are also a number of cheap synthetic products advertised as liners that are not suitable for effluent ponds. You should ask suppliers the following questions before finalising your decision:

<b>Warranties</b>	<ul style="list-style-type: none"> <li>• What kind of warranty is provided?</li> <li>• UV warranty is not enough; it should also cover seams and defects in the lining. Do they check welds and joints?</li> <li>• Is the company likely to be around in the future if a defect occurs?</li> </ul>
<b>Quality Assurance</b>	<ul style="list-style-type: none"> <li>• What written quality assurance information is provided for the installation of your effluent pond liner?</li> <li>• Are they prepared to give reference for previous installations?</li> </ul>
<b>Independent testing of the liner</b>	<p>Has the synthetic lining option been tested using international standards for:</p> <ul style="list-style-type: none"> <li>• Tensile strength</li> <li>• Resistance to static puncture</li> <li>• Water permeability</li> <li>• UV and ozone resistance</li> </ul>
<b>Leakage into the environment</b>	What advice is the pond installation company recommending regarding leak detection?

Synthetic liners will have specific installation requirements such as anchor trenches and pipe penetration through the liner details, surface preparation, and covering requirements.



#### **Synthetic liner for effluent storage ponds**

Drainage of water and gas from beneath and around the pond is an important consideration. In some situations, including locations with high water tables or susceptible soils, water drainage networks under the pond are crucial.

For details see the *IPENZ Practice Note 21: Farm Dairy Effluent Pond Design and Construction*. You can view or download this document at [www.dairynz.co.nz](http://www.dairynz.co.nz) or order a print copy from DairyNZ.

A new chapter on pond liners has been written for the next edition of the IPENZ Practice Note and can be downloaded from:

<http://www.dairynz.co.nz/page/pageid/2145869375?resourceId=731>