



Dairy Effluent: Pond site selection

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The site selection for a single or multiple pond system is one of the most important components of developing an effective effluent system and will require careful planning taking many variables into consideration.

A suitable pond site should be selected to ensure long-term success and provide the best opportunity to irrigate effluent water and the nutrients it carries to as much of the farm as practical.

Factors to consider when selecting a potential pond site

Local government requirements

Local government may require a permit for the construction of a dairy effluent pond due to earthworks and the potential to impact on sensitive environmental issues specific to the area. This will vary between areas and can depend on its potential effect on natural drainage, proximity of floodplains, ground water and extent of excavation.

Buffer distance from sensitive areas

The application and management of dairy effluent from intensive animal activities such as dairy sheds and feedpads falls under the State Environment Protection Act 1970- Waters of Victoria 1988 & 2003.

The requirement for landowners clearly states “*the applications of effluent or waste into or onto land shall be carried out in such a manner and at such a location so as not to cause pollution of groundwater or surface waters*”.

Surface waters include rivers, creeks, reservoirs, billabongs, wetlands, channels, arterial and community drains, lakes, dams, natural or artificial watercourses, coastal or tidal waters but excludes farm dams and private ponds.

Variations to the State Environment Protection Policy in 2003 removed all set buffer distances from waterways, including the stricter requirements when potable (drinking water) was involved.

There is currently no legislative requirements governing the location and designated buffer distance for effluent ponds in proximity to surface waters. However, appropriate considerations to ensure effluent ponds and paddocks applied with effluent do not impact or have the potential to pose a risk to waterways or drainage schemes is paramount.

Industry recommended distances

Various industry and government agencies may recommend buffer distances as a guide to protect specified sensitive areas. These may include:

- 300 metres from a neighbouring residence as effluent ponds will occasionally generate odours.
- 200 metres from a farm bore or spear point.
- 50 metres inside property boundary as a safety factor should ponds fail.
- 60 metres from irrigation channels and drains as required by Goulburn Murray Water
- 45 metres from the vat room as required by Milk Factory Quality Assurance programs.
- 0.5 – 1.0 metres from the pond base and the water table.

These distances however should also take into account “common sense”, as integrating the pond(s) into existing farm infrastructure is essential for long-term success.

Soil type

Many soils are unstable and not suitable for pond construction. Most silt and clay soils are generally adequate for pond construction. However, it may be necessary to take soil samples from the proposed site to determine:

- Soil permeability. (The suitability of the soil to hold effluent).
- Structural stability.

Gravel beds, fractured rock, sandy layers and some clay soils may be prone to seepage, cracking, or tunnelling. If these soils cannot be avoided, ponds should be lined or an alternative system should be considered, such as direct application via sprinklers.

Test holes

The use of a soil map in determining site options may be a good starting point, reduce the necessity of some test holes. Local experience will also be a good guide. An auger hole should be dug to a depth of at least 0.5 metres below the proposed bottom of the pond. A sample should be taken every 0.5 metres of depth and each sample should be examined to ensure that suitable soils exist in the profile. An Extension Officer or designer with experience

in texturing soils can assist in determining if a soil will be suitable for effluent pond construction.

Pond excavations need to be monitored to ensure water, sandy and shale deposits are avoided. If struck the pond will require back filling.

Proximity to groundwaters

Where high watertable are present, a turkey nest pond (above ground storage pond) may be the preferred option. Ponds should not be excavated to or below groundwater levels. There are two reasons for this:

- To stop the groundwater (which is often salty) from entering the pond and reducing the volume available for effluent.
- To stop effluent nutrients leaching into groundwater.

Watertable levels will fluctuate throughout the season and over time. It is recommended that the bottom of the pond is at least 0.5 metres above the watertable when the watertable is at its highest, generally the wettest time of the year. If the watertable is measured during the drier months then make the pond bottom at least 1 metre above the watertable.

Maximise opportunities for effluent re-use

Consideration of where and how effluent will be applied is vital when determining site selection. An adequate area of land for effluent application is essential to avoid waterlogging and soil nutrient overload and to provide flexibility when applying effluent.

For flood irrigation areas such as the northern and Macalister catchments, effluent can be shandied and applied with channel water during an irrigation event. Accessing the farm channel system within close proximity to the farm wheel usually ensures sufficient command to a large percentage of the farm pastures.

Dryland areas need to ensure the installation of main irrigation lines, travelling or fixed irrigators have access to sufficient areas of pasture or crops.

A general rule of thumb is effluent should access at least 10% of the farm pastures to ensure nutrients are distributed evenly. However, a more detailed nutrient analysis of the pond(s) may determine a greater area for distribution.

A whole farm plan is very useful in determining shandying capabilities and sprinkler layouts to determine maximum land areas for effluent application. Undertaking a nutrient map or plan of the farm is also a valuable exercise to ensure effluent applications are compatible with soil fertility levels and fertiliser strategies.

Effluent ponds designed to recycle effluent back to the holding yards for cleaning purposes should be sited in close proximity to a power supply and the washdown system. Recycling effluent for yard washing is recommended from a dual or multiple pond system. These

systems will generally require a larger site to accommodate the ponds.

Future developments of the farm

The location of future farm developments needs to be determined so that any investment on earthworks or infrastructure in the short-term can be integrated to any significant changes on the farm. The inclusion of effluent from other point sources such as feedpads, calf sheds, loafing areas and laneways may also be incorporated into the initial design.

Preparation of a whole farm plan is highly recommended before you alter or develop your effluent system.

Conveyance of effluent

Ponds should be centrally located to enable easy conveyance from the dairy and/or feedpad to the pond and ultimately from the pond back to pastures or crops. Longer distances will increase the likelihood of pipe blockages and the necessity to utilise more efficient pumping equipment.

Wherever possible gravity should be utilised to convey effluent to and from ponds. This can have the advantage over pumping, with a reduction in maintenance and the likelihood of pump breakdowns.

For turkey nest ponds to be effective they need to be located in close proximity to farm channels at a point close to the irrigation wheel. This will enable shandied effluent to access a large proportion of the farm pastures, maximising nutrient distribution.

Other factors to consider when siting

- Proximity to calf rearing
- Avoidance of tree plantations to prevent shading on the pond(s)
- Accessibility to laneways and gateways to allow large machinery to access the ponds
- Allowance for the installation of trafficable solids trap
- Space for future expansion

Additional information may be obtained from other Information Notes in the effluent series or contact the following Department of Primary Industries' offices:

Kyabram	(03) 5852 0500
Ellinbank	(03) 5624 2222
Colac	(03) 5233 5533
Maffra	(03) 5147 0800
Warrnambool	(03) 5561 9946

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