



Effluent Irrigation System Design Parameters

We design and install complete (or partial) effluent irrigation systems, our elements of which will meet the new standards and codes of practice for the dispersal of farm dairy effluent. The questions below all relate to the requirements of the codes or standard. The new codes are not yet legal documents (July 2010) but it is likely that they will become the reference standards for the regional councils, effluent equipment suppliers and dairy farmers. You will find a copy of these on the DairyNZ website.

We charge for the *detailed calculations to correctly size a pond* that meets the standard and codes. (Later we can quote you (free) for our *totally mixed pond*, concept.) The design calculations of pond size become your property but we will also provide a quotation for all of, or elements of, the design. Note that even if you choose to install another pond system, the calculations that we do for the pond volume will still be valid. We will refund charges if you purchase at least 60% of the total value of our design from us.

The pond size calculation report is a document that you can use to support any resource consent application. We guarantee that the calculations conform to the Farm Dairy Effluent Design Standards and Codes of Practice.

Note: Please remember that the best time for earthworks is between December and March. Earthworks outside of these times can suffer frequent weather delays. Plan ahead.

The process:

The first stage is for you to submit data to us. We then discuss options with you; we calculate pond size with rigorous analysis on weather patterns, soil moisture levels, irrigation means and so on, and we then compile a report. This becomes your property after payment has been made, but we retain rights to store the file. The cost of the calculations is refunded if you purchase 60% of the value of our quoted system from us. (See below) Later we will discuss irrigation requirements, reticulation and pumping plant capacity for *our* use.

The second stage should lead on to a detailed quotation for our totally mixed pond and irrigation system. The quotation also enables both you and us to obtain firm quotes for the construction of a lined pond, and any pipe line reticulation work that may be necessary. We would hope this leads to a negotiated contract where we each set out the agreed work to be done by each of us, or by subcontractors.

The final stage is the execution of the contract. This should lead to the completion of a complete and compliant effluent system, or the foundation elements that will enable one to be completed (to standard) later. We also provide detailed drawings of the finished scheme and a manual for the operation of the system. We give you a guarantee that the system will meet or exceed the forthcoming requirements. The draft Code of Practice (a copy of which is available on the DairyNZ web site) lists all the key performance indicators that we have to achieve.

Remember, the initial pond calculation service is refundable, subject to the conditions, above.

Data collection:

As a starting point to the design of your proposed new effluent management system, we need to obtain data that has a vital influence on the design. We would be grateful if you could provide answers to the questions below. [A handwritten response will be fine](#). Add comments on the rear of the pages, should further explanation be required

Your name;

Address:

Farm Address:

Supplier number:

Email address:

Phone:

Fax:

Sources of effluent liquid:

Present herd size:

Proposed future herd size:

Approximate initial calving date:

Duration of calving:

Cowshed yard area:

Method of yard washing: e.g. Floodwash? High pressure Hose? Dungbuster on backing gate? Chain on backing gate?

Do you have an idea as to how much water is presently used to wash the yard?

Approximate yard area? (metres long by metres wide) or diameter. Please allow for drafting areas and crush pads where water or effluent may originate.

Do you allow water from the cowshed roof to drain on to the yard and get to the effluent system?

Is there a feed pad?

What sort of feed do you place on the pad?

How often is this washed down?

Is it also scraped?

How long do the cows remain on it?

How much wash water is used to clean it up?

How large is the feed pad? (metres long by metres wide)

Do you want to add the feed pad material to the effluent and distribute it over the farm via the irrigator?

(The data above is used to estimate the quantity of effluent that may arise, especially in the winter and spring - The critical period

Climate data:

Annual rainfall for your district (millimetres per year):

Does rainfall have a peak in the period from calving to late spring?

Is your area subject to “weather bombs”? Please describe them:-

Where is the nearest NIWA or MetService or regional council weather monitoring station in your district?

Soil moisture deficits:

(Comment: When the top soil has a **moisture deficit** of 40 mm say, then it is capable of absorbing 40 mm of rainfall before it contains the maximum desired moisture. (Field capacity). If you want to use travelling irrigators that apply equivalent rainfall amounts from 6 mm upwards, then irrigation should not really occur before the soil has a minimum moisture deficit of around 10 – 12 mm, say. This would mean that the soil can absorb the effluent and subsequent rainfall. You will be asked to guess in this next question. We may be able to get this data from NIWA)

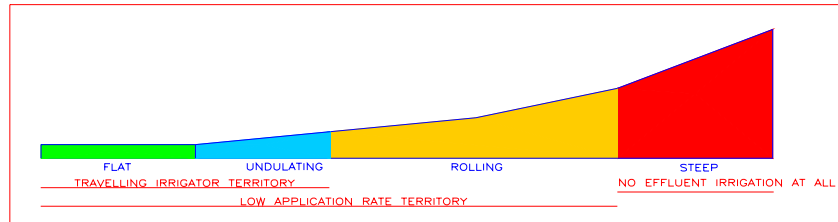
What month of the year, on average, do you believe that the soil moisture deficit would get to **12 mm or more?** (e.g. Mid October, late November?)

Effluent irrigation zone and topography:

(The recommendation is to disperse effluent over 8 ha for every 100 cows. - This is to keep potassium levels low. They cause metabolic ailments. - Thus if your herd is 400 cows, you might have an effluent irrigation block $4 \times 8 = 32$ ha)

Do you have an area of the farm close to the suggested size that can be used to irrigate the effluent?

Is it flat, undulating or rolling?



How close to the cowshed is this area?

Soil data:

(We want to keep all effluent in just the top soil, perhaps just the upper 200 mm of soil.)

What would your average top soil thickness be over the “effluent irrigation block”?

Is there a **classification for the soil** on your farm?

Is the top soil heavy, medium or light?

Does it have any special characteristics? (e.g. does it seal off so that it has difficulty absorbing liquid?)

Does it hold water or is it free draining?

Are there drainage tiles in the effluent irrigation zone?

Does the soil dry out and crack in summer? (This may create liquid pathways direct to the tiles)

Soil nutrient levels:

Have you had soil tests done to determine the nutrients levels in the soil?

What are they?

Does your soil have high potassium (K) levels?

Do you need to add some comments?

Please provide a farm map or aerial photo with you proposed effluent block marked on it?

Effluent holding pond:

Do you have a zone in which you can site a holding pond?

Will the effluent make its way into a full pond by use of gravity or do you think that it may need to be pumped?

Approximately how far away from the shed do you think the centre of such a pond may be?

Do you know how far below ground level that the **winter water table** may be (i.e. below-ground water)?

Is the soil in the region of the pond porous and free draining? (Pond will probably need lining)

Do you have soil on site that you think may be of a suitable nature to construct a pond embankment?

(Some ponds must be constructed above the ground because the water in winter may rise to within 500mm of the surface. Soil for the embankment may have to be imported for some other region)

Are there any special considerations we ought to know about? (Fault zones, tidal zones, shelter belts as a source of leaves, steep slopes, local drains or streams...)

(Comment: If you proceed to the pond stage, we will determine these points in detail, later. Soil tests –for structural details- will be done, water tables investigated, and so on. These questions are to get guideline data.)

Pumping plant:

Do you already have an irrigation pump?

Details; Make, Model, motor power, outlet size

Pipeline system:

Do you already have the farm laid out with pipes and hydrants?

What is the main line pipe size?

Can you lay out the pipelines on the farm map?

Any secondary pipe lines?

Describe how you would ideally like to manage and apply the shed and yard effluent:

(For example, we aim to take all material from the yard and feed pad, to pulverise it and to then send it to a totally mixed pond. From there we would use a travelling irrigator to spread liquids and solids simultaneously. The only labour necessary is yard cleaning and shifting the irrigator in late spring and then through the summer and autumn, with the task of using a front end loader bucket to scoop up and spread sand and grit.) You may desire variations on this scheme...)

Please provide the following material:

- 1) The location of the nearest NIWA, Metservice or Regional Council weather station (You may have to ring and ask them)
- 2) A sketch plan of the dairy shed and all other areas, zones or yards (other than general races) **labelled or named** which collect effluent, leachates or contaminated rainwater, and which must be sent to the pond.
- 3) A farm map if possible.
- 4) Is a visit to your farm necessary?

Comments and notes: (Please add remarks that may affect the effluent system. You may wish to explain how much of a system you already have, so that we can gauge how much extra that you may need.)

This is what a totally mixed, lined pond can look like. All you do is wash down and irrigate solids and liquids all together.

