Weeping Wall

For dairy and feed pad effluent separation

DISTRIBUTED IN AUSTRALIA BY:

DPS DAIRY PUMPING SYSTEMS

RX PLASTICS

Weeping Wall

Features:

- Made of PVC with high physical strength:
  - High UV stability
  - Non-corroding – won't rust
  - Will not swell or warp
  - Will not rot
  - Smooth surfaces
- Triangular bar shape, provides more flow and self cleaning

Benefits:

- Separates valuable effluent into components that are more easily managed and distributed
- Triangular bar gives maximum strength and no barrier to efficient liquid flow while holding back solids
- Made from an efficient bar extrusion that allows various gap spacing between bars (standard spacings are; 4mm, 6mm and 8mm)
- We have a range of sizes available (standard sizes are; 1210mm wide x 1200mm high, 1000mm wide x 1500mm high and 610mm wide x 2000mm high), please refer to your consultant for advice on what size panels would best suit your requirements

Result:

- Green water with minimal suspended solids

NOTE: DO NOT CUT WALLS OR STACK WALLS

Selecting gap size:

4mm gap

- Hosing straight off a yard or flood wash
- Low fibrous material
- Relatively high water content

6mm gap

- Hosing straight off a yard or flood wash
- Average / normal fibrous material
- Average / normal water content

8mm gap

- For use in feed lots where the yards are scraped to clean
- High fibrous material
- Relatively low water content

How many panels do you need?

Rule of thumb is 1 panel per 100 cows would be needed per drying bed.

CODE	GAP	WIDTH	HEIGHT
KLWEEP610.2000.4mm	4mm gap	610mm	2000mm
KLWEEP610.2000.6mm	6mm gap	610mm	2000mm
KLWEEP610.2000.8mm	8mm gap	610mm	2000mm
KLWEEP1000.1500.4mm	4mm gap	1000mm	1500mm
KLWEEP1000.1500.6mm	6mm gap	1000mm	1500mm
KLWEEP1000.1500.8mm	8mm gap	1000mm	1500mm
KLWEEP1200.1200.4mm	4mm gap	1210mm	1200mm
KLWEEP1200.1200.6mm	6mm gap	1210mm	1200mm
KLWEEP1200.1200.8mm	8mm gap	1210mm	1200mm

Weeping Wall is the solution to your separation woes!

Installation design considerations

Overview

The following is a summary of findings, after extensive study of the workings of Weeping Wall – Sludge/Drying Bed installations in New Zealand, England and USA.

These considerations will differ depending on the make up of the effluent.

There are two separate recommended layouts based on effluent make up.

Type 1. **Farm Dairy Effluent (FDE) & Flood Washed Feed-pads**

Where effluent is classed as a liquid with particles of suspended solids. Liquid moves freely between solid particles. Solids generally do not exceed 10%. This effluent has a high liquid porosity.

Type 2. **Scraped Feed-pads**

Where effluent is generally greater than 10% solids, thick liquid to semi-solid effluent. This effluent tends to trap liquid between the solid particles and has a low liquid porosity.

Weeping Walls are not a filter. The filtering process is done by the fibres contained in the effluent and the pressure of the liquid flowing through the pores between the fibres.

For the filtering/settling process to happen two things are vitally important, **Time and Passive Flow**

(i) Time

The design must allow sufficient time for the solids to settle out well before they reach the Weeping Wall.

(ii) Passive Flow

The liquid needs to arrive at the Weeping Wall at close to zero velocity.

FDE (Dairy Effluent with not greater than 10% solids)

As a rule of thumb, Sludge/Drying beds need to be **long and skinny** (at least four times the length to the width) with the liquid entering across one of the narrow ends, travel the maximum distance available, and out the other narrow end.

It is best to have NO fall on the floor. In cases where the effluent arrives with excessive velocity, such floods wash, or it enters down an access ramp, it is recommended that the floor has a negative fall to absorb the velocity.

The more water that flows through the sludge bed, the better, as it helps to keep the flow paths open and maintain flow pressure.

Sludge/Drying Beds need to be a capacity of approximately 80 cubic meters per 100 cows if emptying once a year is the desired management practice.

It is important that the exit side of the weeping wall is clear and unobstructed at all times. Any build up of liquid on the exit side of the wall will result in a failure of the solids separation being effective.

Sludge bed for FDE

Type 1. Shaping of Sludge Bed for FDE

For conventional washdown or flood-washing, sludge beds that are long and narrow are more effective in retaining solids and drying sludge. The flow FORCE of the system is what removes most of the liquid from the sludge and is very much influenced by the shape of the sludge bed, as shown in Figure 1.

Shape of Sludge Bed for **Washed Down Effluent** (conventional or flood)

For conventional wash-down or flood-washing, sludge beds that are long and narrow are more effective in retaining solids and drying sludge. The 'energy' of the liquid flow is what removes most of the liquid from the sludge and is very much influenced by the shape of the sludge bed. Long and narrow beds ensure all the flow is in the same direction.

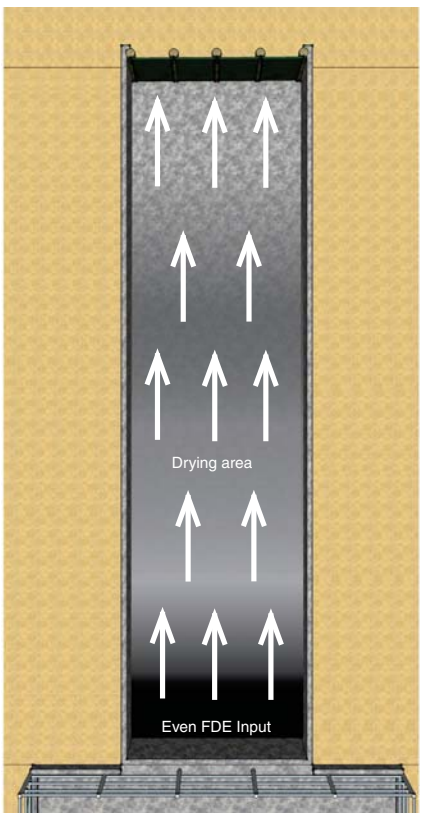
The positioning of the inflow and the Weeping Wall are also an important aspect in relation to generating the desired flow 'energy'.

Ensuring the inflow and the Weeping Wall are the maximum distance apart, and that there are no areas of the sludge bed where the flow will bypass, is very important.

Introducing the inflow across the width of the sludge bed ensures the complete area is active in the process of liquid separation. As opposed to a single point entry, where the corners will remain wet as a result of 'confused' flow paths.

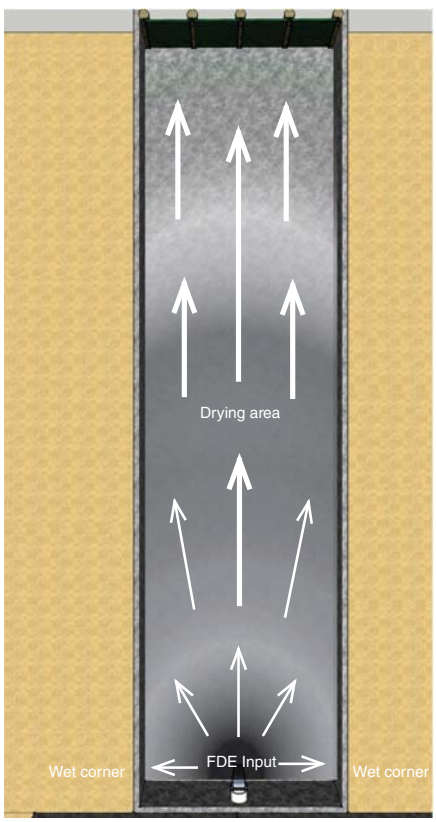
If the design of the drying/sludge bed varies from this 'ideal' long and narrow shape, a considerably larger area of weeping wall will be required to achieve anything like the same result in terms of consistently 'dried' sludge.

Figure 1



Type 1 with even FDE input

Minimum width
1:4 length



Type 1 with single point FDE input

Sludge bed for scraped feed pads

Type 2. Shape of Sludge Bed for Scraped Feed-pads

The first consideration is probably how we would plan to empty the sludge bed. If the plan is to use an excavator, it is necessary not to exceed the reach of the machine. If a loader is to be used, an allowance needs to be made for entry/exit and turning.

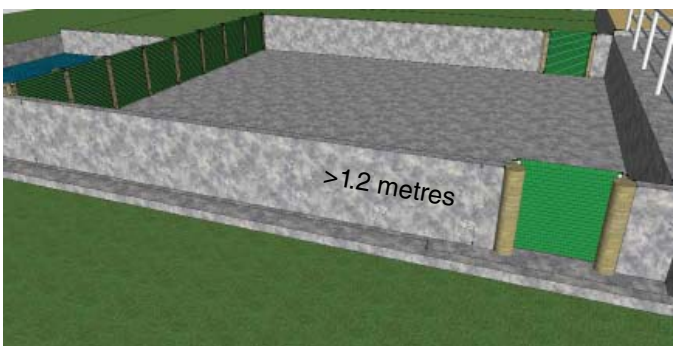
The desired shape for Scraped Pads is squarer than for FDE (type 1) systems.

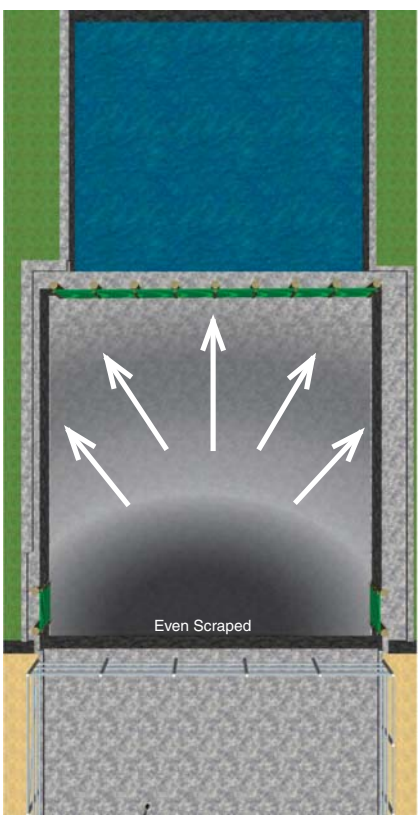
The separation process is more about pressure from the weight of the solids pressing the liquid out verses liquid flow as in the case with wetter effluent, (FDE).

The most liquid will be removed if all the walls consist only of weeping panels.

The design needs to allow for excess liquid to be removed before it, 're-wets' the dry/drying solids. Having some weeping panels near to the scraping entry point will help with the removal of any extra liquid from rainfall or when the effluent is wet.

As we are looking for the weight of the solids to generate the pressure to squeeze the liquid, the depth of the sludge bed becomes important. Having a sludge bed that is sludge and greater than 1.2 meters deep with a higher percentage of wall area as Weeping Wall panels will provide optimum liquid removal.





Type 2 Scraped feed-pad

Parallel weeping walls

If considering a parallel weeping wall design for dairy effluent, you need to be aware of Patents NZ 575038 and 561997.

Weeping Wall considerations

Engineering design

Weeping Wall panels experience a lot of pressure from the effluent retained behind it.

Weeping Walls should be engineered to withstand the forces of the stored effluent, as well as any extra force that may come from the process of emptying the bed.

Aspects to consider include:-

- Height of the wall
- Spacing between the support posts or framing
- Sizing of the support posts or framing
- Depth of support bedded into the foundation
- Strength of Weeping Wall panel
- Method of solids removal and the added press this will generate on the Weeping Wall surface

The area of Weeping Wall should be equivalent to the end dimension of the drying bed i.e width x depth.

RX Plastics Weeping Wall panels are engineered to withstand given loadings.

- The loading at the bottom of a **1210mm wide** panel limits the height it can be used to a **Maximum of 1200mm**
- The loading at the bottom of a **1000mm wide** panel limits the height it can be used to a **Maximum of 1500mm**
- The loading at the bottom of a **610mm wide** panel limits the height it can used to a **Maximum of 2000mm**

The weeping wall panels need to be installed in/on an area of concrete. This is for two reasons,

1 To ensure that the water flowing through the panel does not erode the ground around the supporting structure and beyond.

2 To stabilise the ground around the support posts to ensure the integrity of the structure. We have seen a number of failures caused by a lack of consideration for the force of the solids held and the extra force of the emptying process.

We recommend the use of a suitably qualified Structural Engineer to assess the ground conditions, soil type and structure, to ensure a design that is fit for purpose.

Excavator loading the dried sludge

Excavator loading a muck spreader

Muck excavator evenly distributing the dried sludge

The Process

Starts from cows

COWS + DAIRY SHED

Solids/Raw Effluent

SEPARATED
(SOLIDS + LIQUIDS)

Liquids

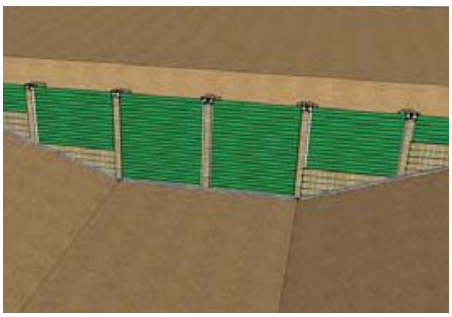
K-LINE™
LOW APPLICATION RATE

Dispersal

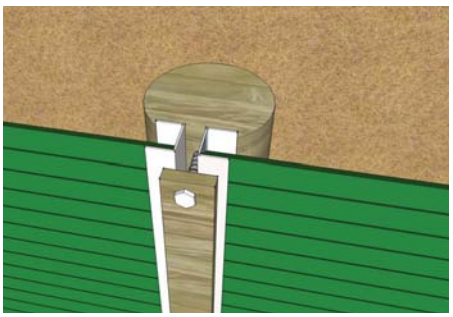
Installation options

The white panel edges require full load support along the entire vertical surface of the support post or frame. Please refer to your consultant for further details.

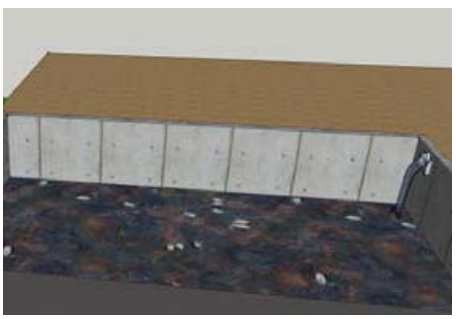
Examples of use



Battered wall installation. The walls are cut at a horizontal, concrete sill to prevent erosion under the wall.

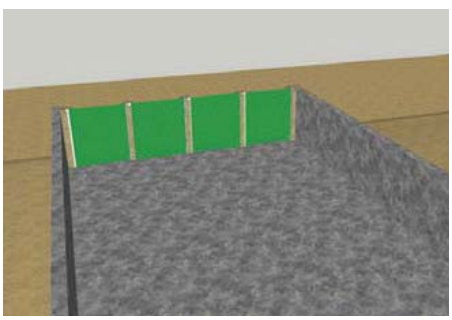


Connection to round wooden posts using coach screws top and bottom is sufficient as the force is directly applied to the wall.

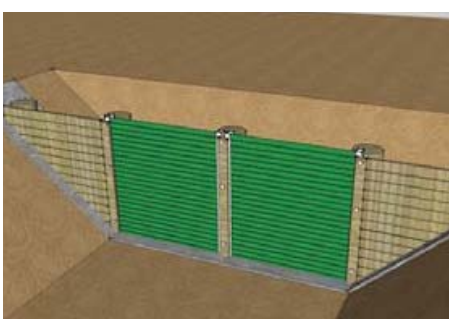


Side entry concrete drying bed. Walls supported with steel or wood.

Twin drying beds with twin Weeping Walls into a storage lagoon.



Free standing concrete drying bed with concrete floor.



Battered walled drying bed with blank section on the batter.

See your consultant for design, selection and implementation.

Liquid Dispersal – K-Line™

K-Line™ is the ideal effluent Dispersal system:

- K-Line™ Std
- K-Line™ Mid
- K-Line™ Max
- K-Line™ has a solution to suit your situation

What is K-Line™?

- K-Line™ is a flexible hose line sprinkler system originally designed for irrigation. However, the low application rate makes the K-Line™ system suited to effluent distribution. At the heart of the system is a series of tough plastic pods protecting a sprinkler, firmly attached to special K-Line™ K-Pipe™
- Lower application rates means the effluent can be applied more often on wetter soils, therefore smaller ponds are often specified
- K-Line™ provides an excellent method of liquid dispersal options from the many and varied sources
- K-Line™ systems are all designed to operate at low pressure
- K-Line™ provide a number of product choices which gives you maximum flexibility of a customised effluent dispersal system for your farm
- K-Line™ will suit any paddock shape, size or terrain
- K-Line™ is easily moved by any quad-bike or farm vehicle
- K-Line™ is a low application rate system

RX PLASTICS
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