

## On-site Wastewater Management Training Course

### Passive Dosing Systems

#### Siphons and Flouts, Low Pressure Effluent Distribution Systems

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### Siphons

- Transform low or variable flows into regular doses
- Suitable for pressurising manifolds and drainfields
- Have no moving parts
- Require no electricity
- Technology over 100 years old
- Require understanding to ensure appropriate use and operation

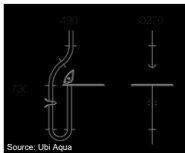
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### Various Siphons Available


- Stafford siphon
- Flowking
- ecoteam Surgeflow
- Ubi Aqua by ecoteam
- Orenco



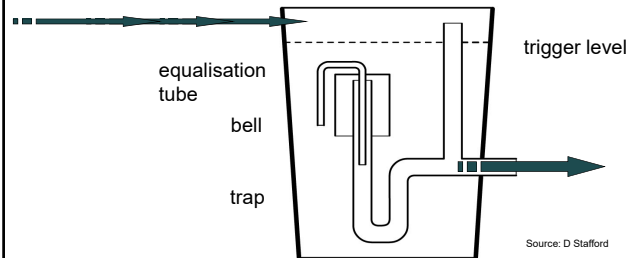
Source: Aris Wastewater Clinic




Source: Ubi Aqua

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### Dosing Siphon Anatomy

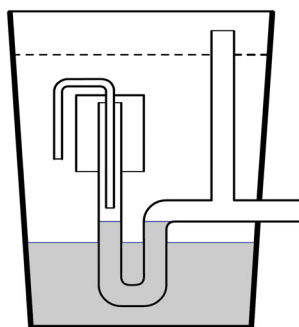


Source: D Stafford

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### Siphon Cycle

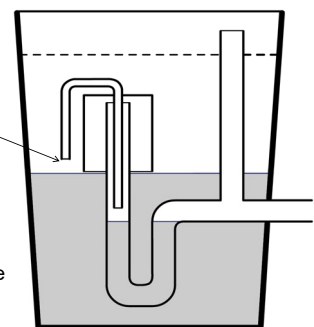
trap primed



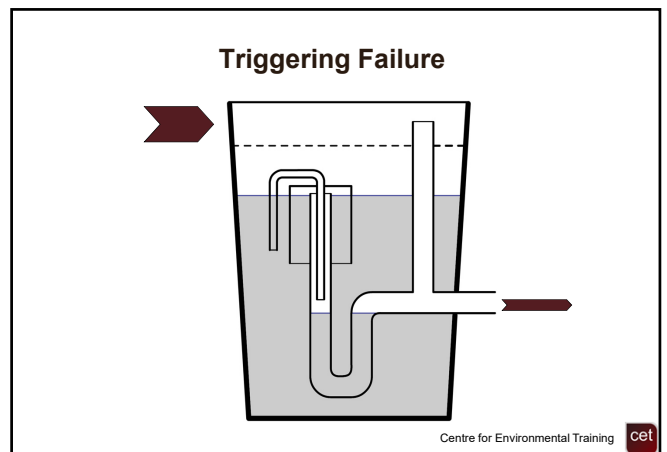
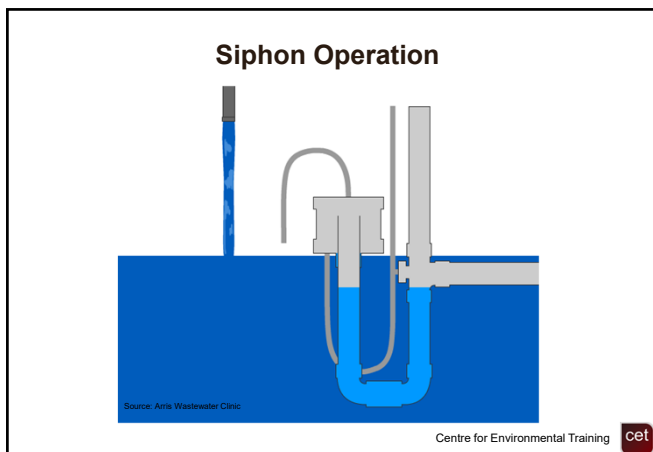
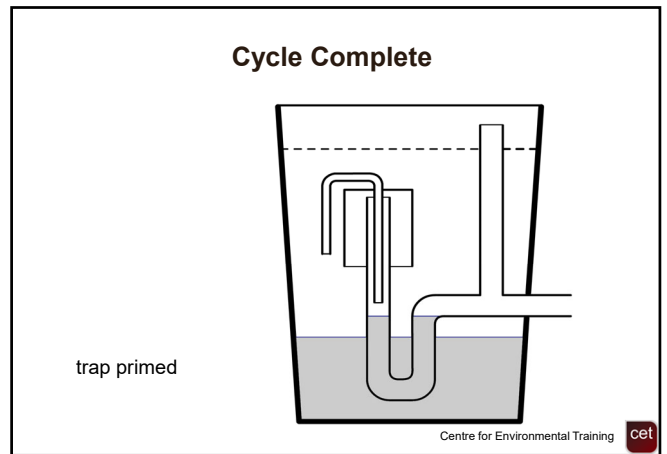
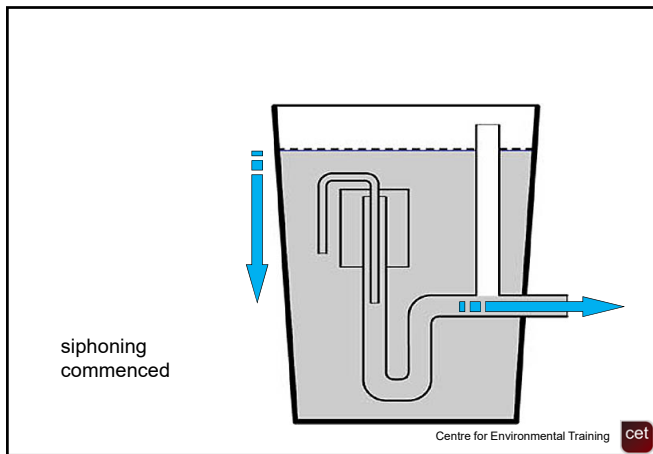
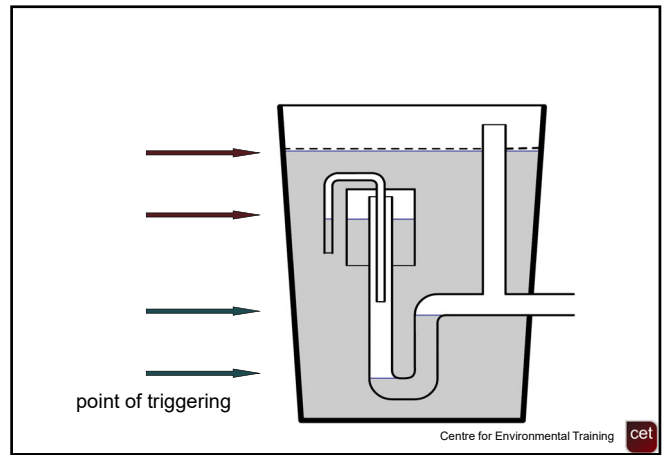
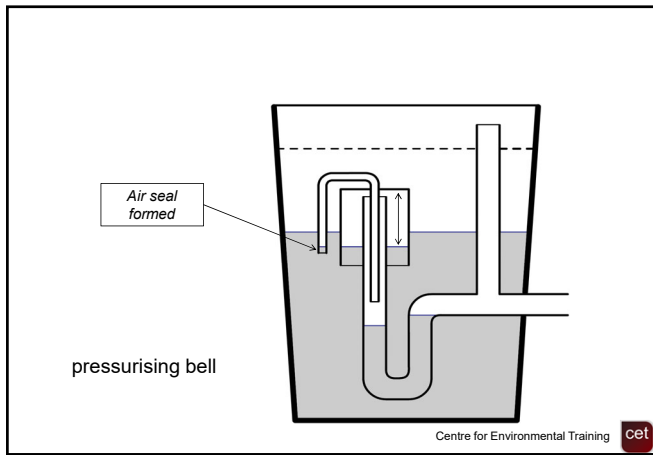
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start and end of cycle

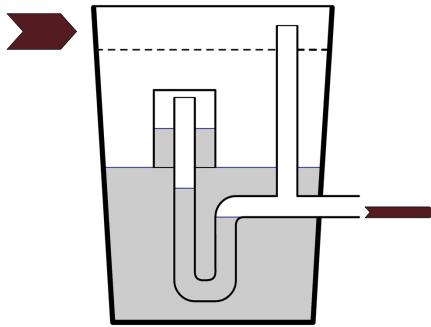
Vented to atmosphere



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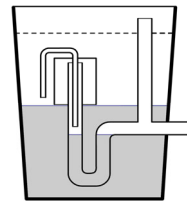


### Resetting Failure



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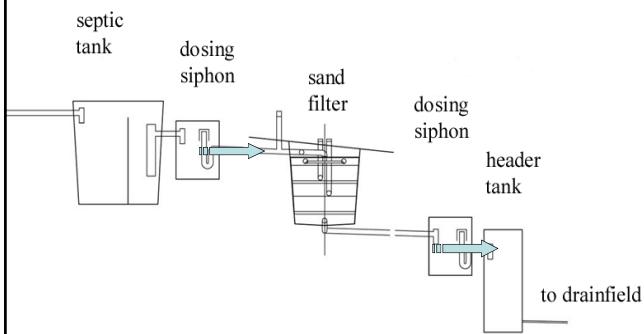
### Performance Optimisation



- Outlet filter must be fitted to the septic tank
- Bell:trap volume approximately 3:1
- Bell diameter:trap pipe diameter approximately 3:1
- Deep trap easier to trigger
- Shallow traps need to be driven with high inflow rates
- Balance tube required for reliable resetting
- Calibration of relationship of balance tube ends important

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### Practical Use



### Applications



- Domestic waste water treatment system, Martinsville, NSW
- One of two dosing siphons in the system

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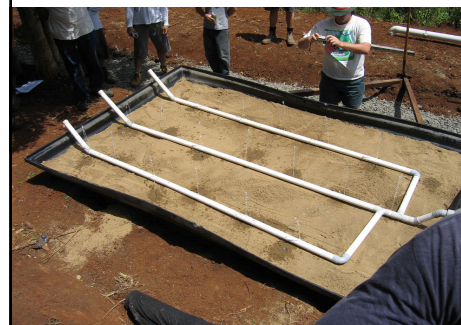
### Applications



- Cheese making waste treatment, Nimbin, NSW
- Doses a drainfield manifold with limited fall



### Applications

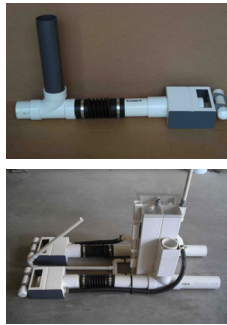


- Testing squirt height and uniformity, near Nimbin

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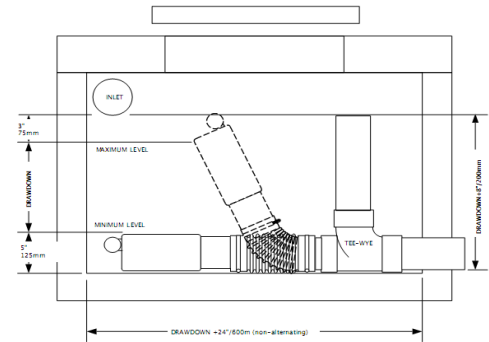
## Flout

- Single flout
- Double flout
- Low drawdown possible with larger dose volume
- <https://rissyplastics.com/flout-systems/about-the-flout.html>
- <https://www.onsiteisite.com/the-flout-dosing-device/>



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## Flout



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## Flout dosing a sand filter



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## Flout



## Low Pressure Effluent Distribution (LPED) Systems

### Definitions (AS/NZS1547:2012)

#### LPED Irrigation

- Shallow subsurface irrigation of effluent into topsoil through low pressure effluent distribution (LPED) lines

#### LPED line

- A pressure line perforated with drilled squirt holes and nestled in a distribution line

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## LPED Irrigation

- Suitable for both Primary (with outlet filter) and Secondary effluent
- Practical on moderate slopes up to 10-15%
- Not suitable for Cat 1 and Cat 6 soils
- Effluent distributed into shallow trenches 200mm wide by 200mm deep, excavated in good quality topsoil
- Minimum 250mm topsoil depth required for application onto Category 5 soils

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## LPED Irrigation

- Require dosed flow by siphon or Flout (low pressure) or pump (pressure) - not gravity fed
- Ensures even distribution along entire LPED trench; avoids spot loading of slotted pipe
- Facilitates hydraulic and nutrient uptake by transpiration and seepage
- Use sequencing valve to alternate loading of lines (pump only)

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## LPED Irrigation

- Minimum 1,000mm spacing between LPED trenches
- Trenches constructed along the contour on sloping ground (max 15% gradient)
- All LPED systems should incorporate capacity for flushing (as per Figure M3)
- LPED systems require appropriate consideration of hydraulic design

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## DIRs for LPED

Soil Category	Soil texture	Structure	Drip and spray irrigation	LPED irrigation
			DIR mm/day	
1	Gravel and sand	--	5	Not advised
2	Sandy loam	All	5	4
3	Loam	All	4	3.5
4	Clay loam	All	3.5	3
5	Light clay	All	3	2.5
6	Medium to heavy clay	--	2	Not advised

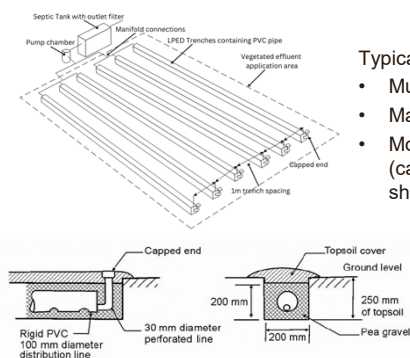
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## LPED Irrigation

- Pressure line 25-40mm PVC with 3-6mm drilled holes at appropriate spacing for even distribution along whole length
- Clean water test to observe even squirt height before covering
- Distribution line Ag-pipe or slotted 100mm PVC

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## LPED Irrigation



- Typically:
- Multiple hydraulic zones
  - Manual flushing
  - Mounded surface (capping) to finish to shed rainfall

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## References

- The Flout Dosing Device. A device for gravity dosing of effluent or stormwater.  
<https://rissyplastics.com/flout-systems/about-the-flout.html>
- Arris Wastewater Clinic automatic dosing siphons  
<https://www.arris.com.au/water/products/automatic-dosing-siphons/>

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