Effectively Using Flow Equalization Tanks to Manage Wastewater

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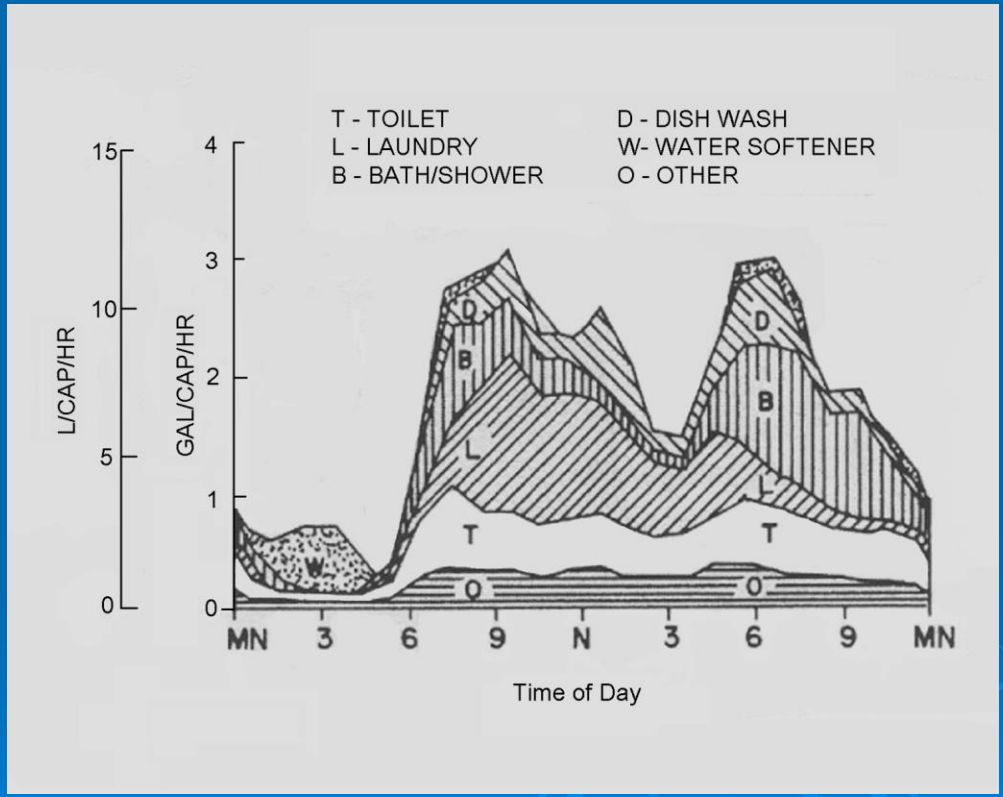
Overview

- Control peak flow events
- Improves system performance
- Timer controlled pump
- Buoyancy considerations critical
- Managing downstream flow
- Amber alarm and Peak enabler
- Special features

Water Quantity

- Daily Flow
  - Design
  - Actual
- Flow Estimates
  - People served
  - Square Footage
- Peak Flows
  - Daily - Runoff Period
  - Weekly
  - Seasonal

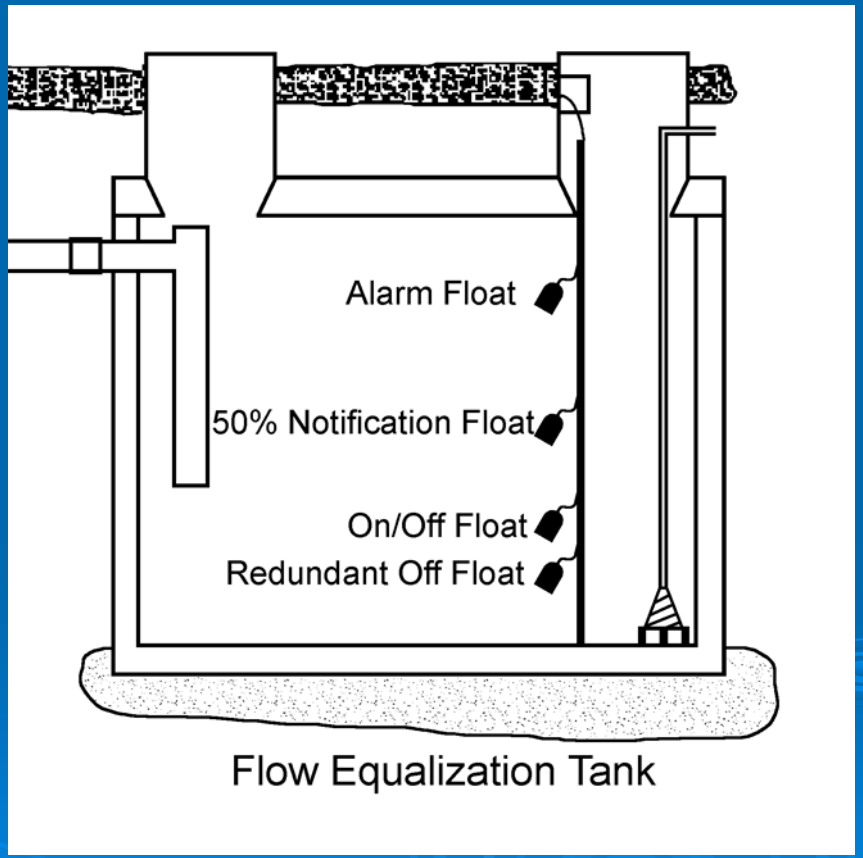


Controlling flow from a facility

- Owner controls water usage to match clarifier capacity
- No large water using devices
- High water use days.

Flow Equalization/Surge Tank Concepts

- Moderate Flow
  - Daily fluctuations
  - Weekly fluctuations
- Down stream components
  - Function more effectively
  - May allow decrease size

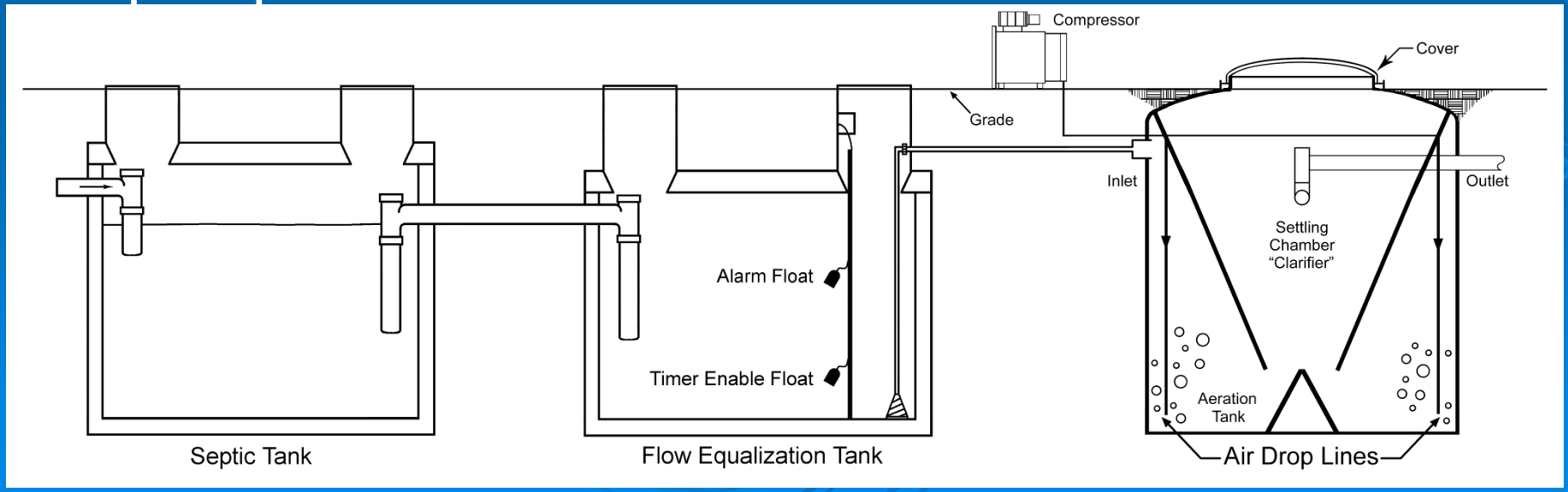


Timed Dosing – Pump Control

- Flow controlled by time
- Timers
  - ON: OFF
- Programmable Logic Controller
  - PLC
  - Computer

Incorporating flow equalization

- Modify the treatment train by adding components
- Add an additional tank between the trash tank and treatment components
- Upsize trash tank to full size septic tank, add pump with timer controls to dose treatment



Flow Controlled by Surge Tank

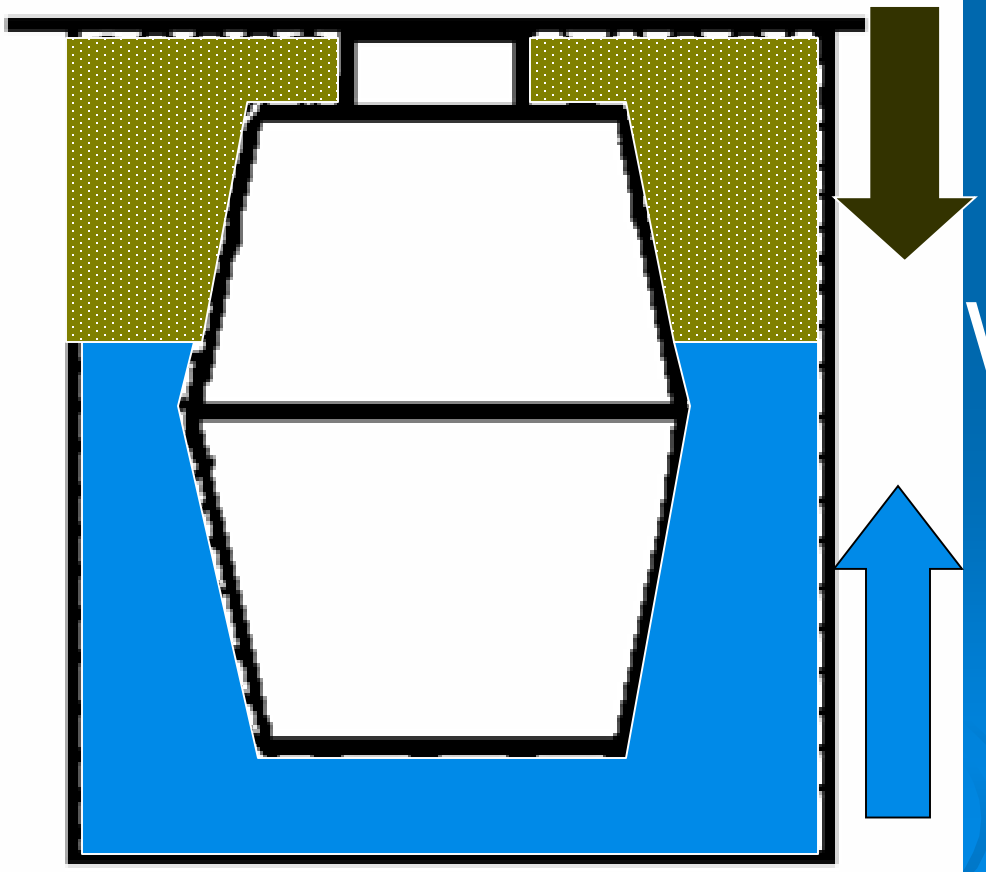
Day	Daily Flow (gal)	Timed Dose (gal)	Volume in Tank (gal)
Sunday pm			1000
Monday	250	350	900
Tuesday	200	350	750
Wednesday	150	350	550
Thursday	200	350	400
Friday	250	350	300
Saturday	700	350	650
Sunday	700	350	1000

Tank Buoyancy

- Tank is water tight component
- Empty containers will float on water.
- Volume of displaced water is greater than weight of tank.

Ponding around installed tank

- High groundwater
- Tight soil at site, backfill and a heavy rain



Weight of soil

Weight of tank

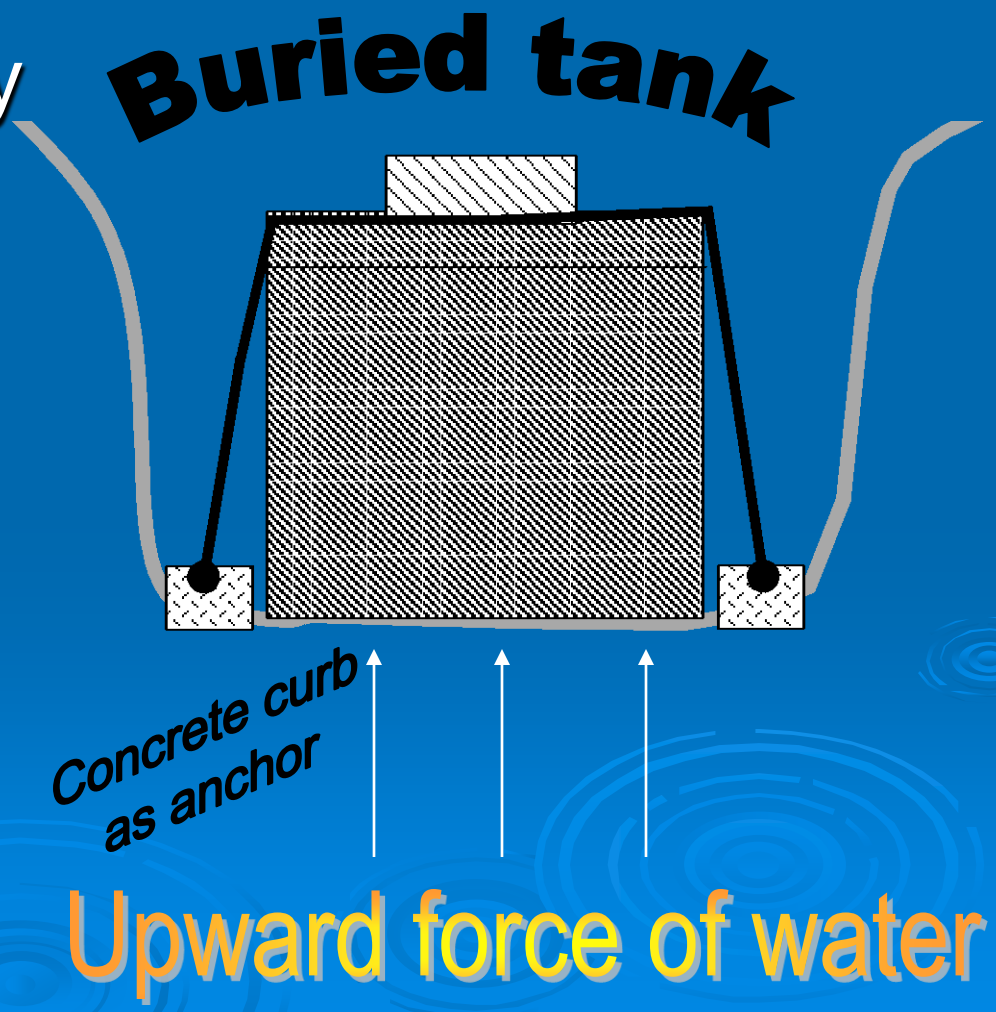
Water displaced

Tank Flotation Controls

- Tank collar – weighted concrete
- Tank side supports
- Deadman – concrete beam
- Soil screws

Flotation prevention

- Does tank bottom have the necessary strength?
- Upward forces are significant

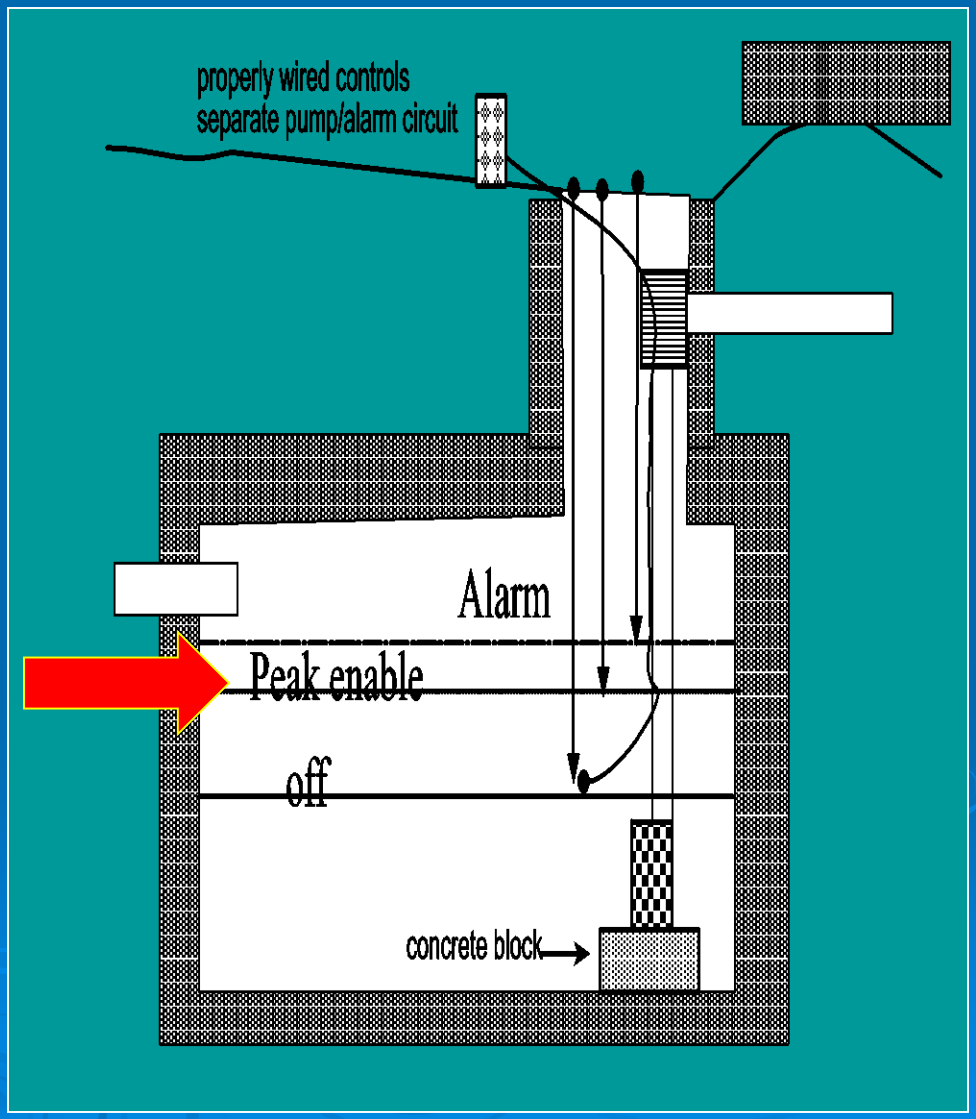


Managing Downstream Flow

- Timer control for pump(s)
- Restricting flow rate
  - Recycle water to tank
  - Restricting valve
- Separate water to multiple downstream treatment components
  - Flow splitting
  - Duplex pumping

Sensor Functions

- Off
  - Turns timer off
- On
  - Timer operates the pump
- Alarm
  - Turns on the alarm
- Peak enabler
  - Changes the dosing frequency (PLC)
- Amber alarm



Special Features

- Aeration
- Pump on bottom of tank
- Pump and haul accumulated “extra” water

Summary

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References

- CIDWT. 2009. Installation of Wastewater Treatment Systems. Developed by Consortium of Institutes for Decentralized Wastewater Treatment (CIDWT). Midwest Plan Service. Iowa State University. Ames, IA. December 2009.
- CIDWT. 2006. Residential Onsite Wastewater Treatment Systems: An Operation and Maintenance Service Provider Program. Developed by Consortium of Institutes for Decentralized Wastewater Treatment (CIDWT). Midwest Plan Service. Iowa State University. Ames, IA. January 2006.