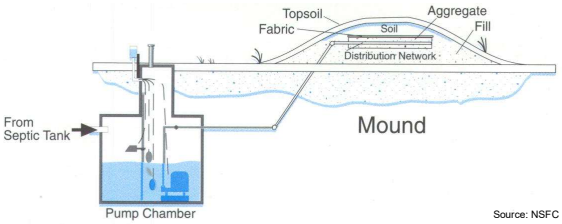
Sand Mounds
An Introduction

Mound Systems

- Mound Systems are in effect above-ground bottomless intermittent sand filters



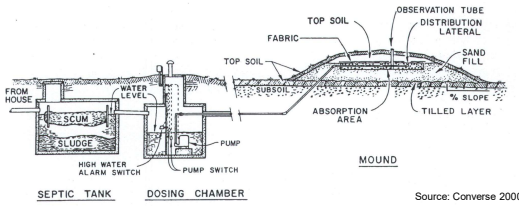
Source: NSFC

Mound Systems

- Mound Systems
  - Treatment and soil absorption system
  - Elevated above natural soil surface
  - Uses suitable fill such as quality sand media
  - Pretreated effluent is dosed to the mound
  - Overcome site restrictions such as:
    - Slowly permeable soils
    - Shallow permeable soils over porous bedrock
    - Permeable soils with high water table

Wisconsin Mound

- Developed in 1970s
- Incorporated in Wisconsin Code in 1980s
- Over 30,000 Wisconsin Mounds in Wisconsin



Source: Converse 2000

Wisconsin Mound

Source: P Geary

Wisconsin Mound in Wisconsin

Wisconsin Mound

Source: B Banens

Wisconsin Mound in Australia

Mound System Componentry

- A Mound System is in effect a bottomless intermittent sand filter that, where possible, utilises the assimilative capacity of the native soil beneath as part of the treatment system
- There are three major components of a mound system design:

1. The interceptor tank
2. The dosing chamber

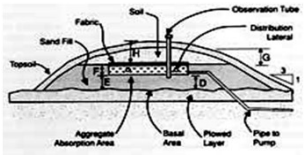
Mound System Componentry (cont.)

3. The mound itself is generally constructed at or above the natural grade and contains:

- A pressurised effluent distribution system comprising a series of drilled pipe laterals connected to a central effluent delivery pipe. The distribution system is set in a bed of washed coarse aggregate (~20mm - 25mm) to prevent clogging

Mound System Componentry (cont.)

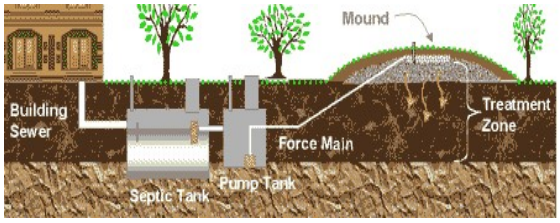
- A 600mm (min) bed of sand or alternative media to specification. The sand bed is formed in a mounded shape and interfaces with the natural soil surface. The natural soil beneath the mound area is ripped to maximise infiltration of effluent, and



Mound System Componentry (cont.)

- A topsoil cover or cap, placed over the entire surface of the distribution system and sloped sidewalls of the filter bed. The surface is typically planted with turf, or suitable plant species to facilitate air transfer to the filter bed and maximise evapotranspiration within the mound system

Mound System Typical System Configuration



Source: Vernon Olson and Sons Excavating, Inc.

Mound System Operational Examples - Construction

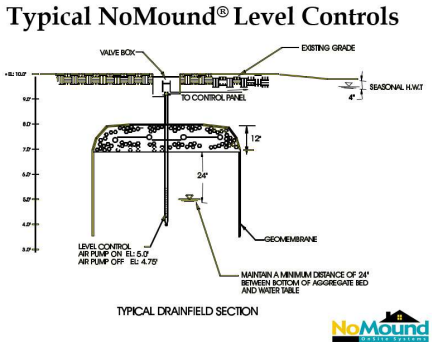
Mound System
Operational Examples - Finish

Variants

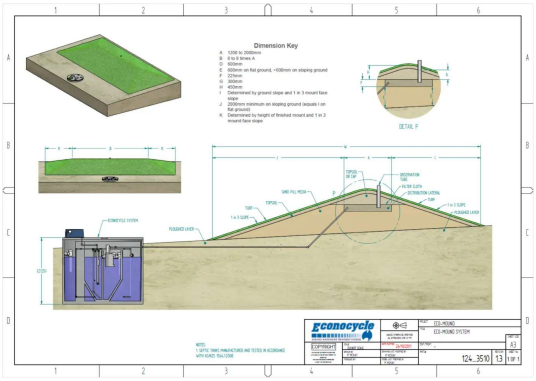
Will find other types of mounds:

- Buried mounds (No-mound)
- Eco Mound – LAA for Econocycle AWTS
- Nutrient removal mounds:
  - Ecomax, AEWS
- AES Raised Pumped Bed
- Local variants:
  - "Trine Mound"- a hybrid pressure dosed Intermittent Sand Filter, Trine Solutions, Billinudgel NSW
  - "Engineered Mound", True Water, Townsend NSW

NoMound



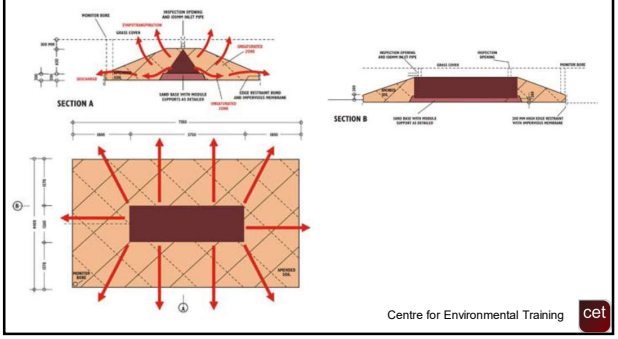
Eco Mound



Ecomax

- Original designed in WA using red mud
- Phosphorus sorption
- NSW variant used blast furnace slag
- Now significantly less mound shaped
- Generally used as land application for secondary treated effluent
- Sized using a water balance
- Previously used peripheral trenches, now uses an underlying sand bed for seepage
- Promotes a high level of N removal
- P removal now described as an add-on

Ecomax



Trine Mound

- Trine – Billinudgel NSW
- 5-bedroom house, footprint 100m^2
- Sandon River National Park Camping Ground
- Hybrid pressure dosed Intermittent Sand Filter

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"Engineered Mound"

- True Water
- "Raised" mound
- Domestic and commercial scale installations
- Secondary treated effluent so just for disposal, uses higher DLR than recommended

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"Engineered Mound"

- Consider height and exposure for evapotranspiration
- Compare aerial irrigation rate with conventional irrigation
- Beware non-standard design features including clay cover

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