Leaching Systems

Technical Standards VIII B

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Connecticut Department of Public Health
Keeping Connecticut Healthy

Leaching System

- Properly functioning leaching system should treat and disperse effluent (liquid from the septic tank) into the surrounding soils without breaking out on the ground surface or polluting the groundwater.

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Leaching types

- Trench
- Pits
- Galleries
- Proprietary products
  - Plastic chamber
  - Mats
  - Forms
  - Cardboard

Treatment

- There are two types of biologically-based wastewater treatment processes:
- **Aerobic** and **Anaerobic**
  - Anaerobic: Lack of oxygen
  - Aerobic: Requires oxygen

http://www.nesc.wvu.edu/pipeline.cfm

Treatment

- *Anaerobic bacteria* living inside the septic tank transform organic matter in the wastewater.
- No additives are needed!

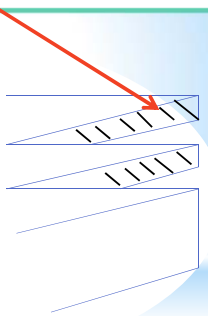
Treatment

- **Aerobic** processes use bacteria that require oxygen to break down the waste.
- In traditional septic systems, once wastewater leaves the septic tank, it flows to the leach field where oxygen-loving bacteria work.
- A layer of biological slime (Biomat) is formed on the bottom and sides of the leaching trench/structure at the soil interface.
- Internal biomat forms for products specifically designed to facilitate vertical growth.

How does a leaching system work?

* The biomat is composed of anaerobic microorganisms (and their by-products) that anchor themselves to soil and rock particles. Their food is the organic matter in the septic tank effluent.
* Biomat:
  * Reduces solids and pathogens.
  * Reduces the rate sewage effluent moves into the soil.

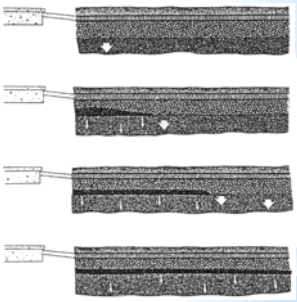
Internal Biomat

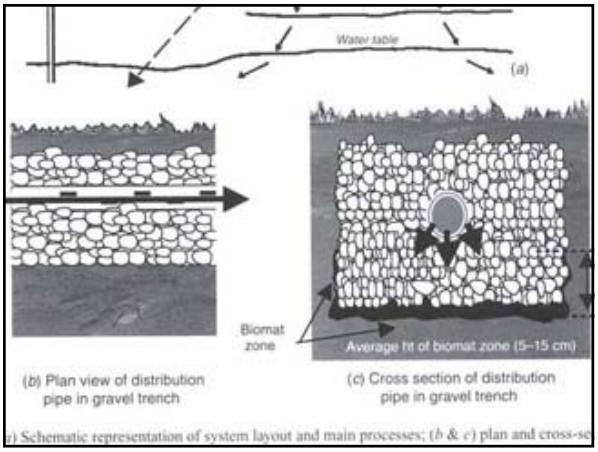


Formation of a Biomat

Gravity Distribution

TIME



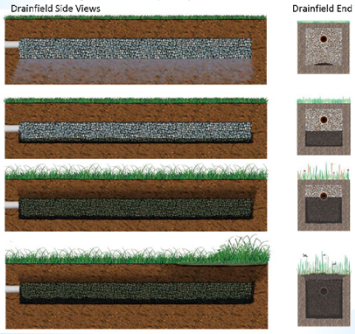


Too much Biomat

Progression of Septic System Failure Over Time

Drainfield Side Views

Drainfield End Views



Leaching Trenches (pg. 37)

* Distribution pipe covered with at least 2" approved aggregate unless high strength pipe is used
* Stone aggregate must meet No. 4 or No. 6 stone aggregate gradation

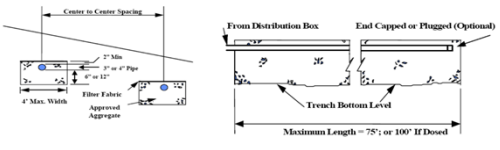


Figure No. 11 – Leaching Trenches

https://www.youtube.com/watch?v=9Jb_QHiFnTg

Leaching Pit

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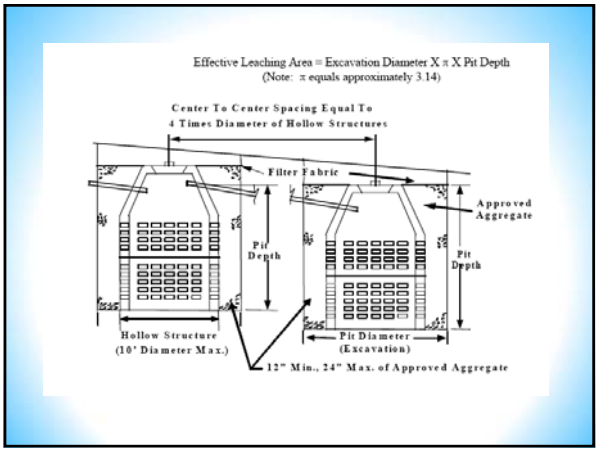
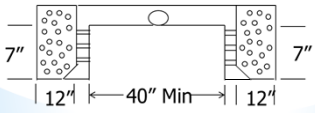


Leaching Galleries

- Hollow structures (typically concrete) with open bottoms and perforated sides
- Must follow ground contours and be level.
- Must use No. 4 stone (larger stone) 12" of aggregate required on gallery sides and ends
- Minimum width of structures is 4 feet



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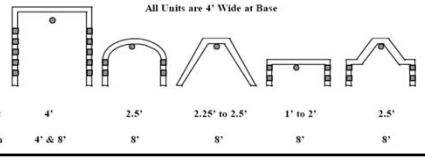
Leaching Galleries

Gallery Height (inches)	Effective Leaching Credit (SF/LF)	Center to Center Spacing (feet)
48	9.2	12
36	8.0	12
30	7.4	12
27	7.1	12
24	6.8	12
18	6.2	12
12	5.9	12



Leaching Galleries: 12"

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Galleries – 4’ x 4’

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Galleries - 27-inch Teepees

https://www.youtube.com/watch?v=QkUQvUKuMM4

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*Gallery Configuration

- *Plastic proprietary leaching units can be installed side by side in a gallery configuration
- *Must be installed in a 6 foot wide excavation surrounded with stone to get gallery credit

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Section VIII E: Proprietary Leaching Systems

* Must be installed per manufacturer's specifications
* Several manufacturers require use of a washed sand/ASTM C 33 sand. Any sand used within proprietary leaching systems must meet or surpass select fill gradation requirements.
* Proprietary leaching system manufacturers must ensure installers are properly trained on installation protocols

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Plastic Chambers

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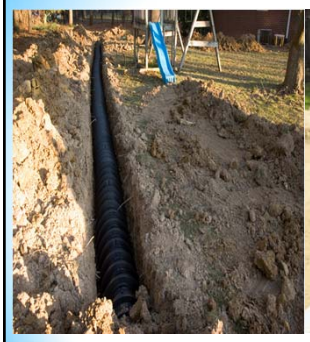

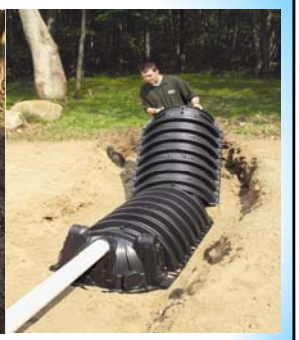

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Form Cell: Living Filter

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Living Filter

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GreenLeach Filter

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GeoMat Flat

Roll out mat

GeoMat Flat

Lay distribution pipe over system per design

GeoMat Flat

Cover system with minimum of
2" of permeable fill over system

Set form in trench

GeoMat Edge

Place mat into smaller slot in form

GeoMat Edge

GeoMat Edge

Fill with sand and compact

GeoMat Edge

Continue until desired length is met

Place distribution pipe on stone

GeoMat Edge

GST Leaching System

Compact and level sand

GST Leaching System

Place stone

https://www.youtube.com/watch?v=hrEWuAYZGbU

Eljen Mantis

Excavation and Sand Leveling

Place Units in the Trench, Glue the Joints, Adjust Modules

Place the Specified Sand

Remove Cardboard Corners - Cut the Straps

Add Specified Sand Around Units

https://www.youtube.com/watch?v=y-goc1z6DpI

*Perc-Rite

*Perc-Rite

*Perc-Rite

Leaching Systems General

Technical Standards Section VIII

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Section VIII A Leaching Systems (pg. 34)

- To be installed as shallow as possible
- Bottom of leaching system to be installed at least 48" above ledge rock
- Bottom of leaching system to be installed at least 18" above maximum groundwater
- 24" separation if:
  - design flows 2000 GPD or greater,
  - tidally influenced, or
  - Percolation rate faster than 5.0 minutes per inch

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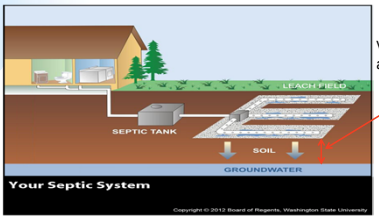
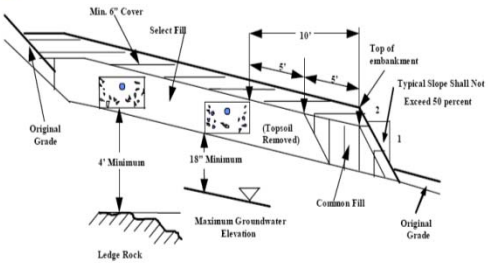


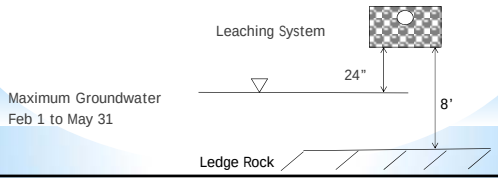
Vertical separation above groundwater



MINIMUM SEPARATING DISTANCES ABOVE LEDGE ROCK AND GROUNDWATER

Leaching Systems (pg. 34)

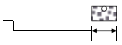
- If percolation rate is faster than 5.0 minute per inch the minimum separation to maximum groundwater shall be increase to 24"
- If percolation rate is faster than 1.0 minute per inch the minimum separation above ledge rock shall be increased to 8' or the distances shall be doubled from any water supply well in accordance with the specific provisions in Table 1 (Item A)



Leaching Systems

Leaching System bottom not to be installed more than 8' into finished grade. <8'

- Max width of a leaching product is 6.5'



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Leaching Systems

* Leaching systems under vehicular travel areas must be capable of support H-20 loads
* Proprietary systems shall only be installed in vehicular travel areas if authorized by the manufacturer, and are required to provide H-20 loading supporting documentation to DPH

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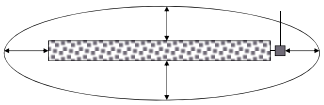
Leaching Systems

* For suitability purposes, the leaching system area includes the soil within 10 feet in all directions of the leaching system.
* Leaching systems for new construction and code complying areas (B100a) shall not have unsuitable soil conditions.



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Reserve Area

* Required for new construction where public sewers are not currently available or will not be available for at least **5 years.**
* Reserve areas are a second leaching system area where another leaching system could be constructed if the primary system failed or otherwise had to be extended/relocated.
* Reserve areas are not required to meet MLSS, however, where feasible reserve areas should provide additional spread.

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Reserve Area

* Reserve area preparation required for multi-family and commercial buildings that are located under paved asphalt or poured concrete vehicular travel areas only.
* Reserve areas are not required for outbuildings with design flows of 150 GPD or less on single-family residential building lots.

Leaching System: Grading

* Entire system area must be graded & maintained to lead surface water away from area
* The licensed installer is responsible to provide erosion & sedimentation controls (i.e., grass seeded/covered with hay)
* The entire subsurface sewage disposal system must be protected from erosion not just leaching system

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1 10:53AM

Minimum Cover

- **Six inches** minimum cover over leaching systems is required.
- Some proprietary leaching systems require additional cover especially in cases where vehicle loading is anticipated
- The installer must cover the leaching system **within 2 working days** following final inspection by local health department or prior to heavy precipitation events

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Metal Pipe Prohibition

- No metal pipe (cast or ductile iron) shall be used after the septic tank
- Only non-corrosive pipe (plastic) approved distribution pipe is listed in **Table 2-A** can be used
- Thin wall 4-inch pipe must be bedded in stone

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Filter Fabric

- All leaching system stone (trenches, galleries, pits) must be properly covered with approved filter fabric as listed in Appendix C.

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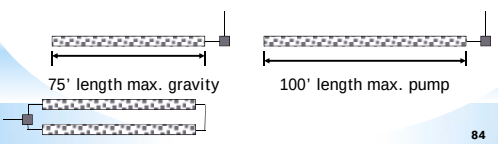
Row Length

- Individual leaching rows shall not exceed 75' in length, unless dosing (min. 25 gallons/cycle) is provided, in which case a maximum length of 100' may be utilized.



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Center to Center Spacing

* Leaching system trenches, rows, or pits must provide the minimum center to center spacing requirements listed in the appropriate subsections B (trenches), C (pits), D (galleries), or E (proprietary products)
* Center to center requirement applies also to reserve system location relative to the primary system

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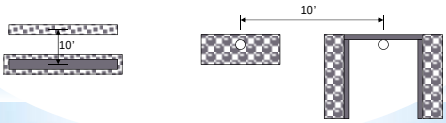
Center to Center Spacing

* If **two different types** of leaching systems are utilized side by side, the **average c-to-c** spacing shall be maintained

  Example: 12" x 48" stone trenches next to 4' x 4' galleries= 10' c-to-c required (Average of 8 and 12)



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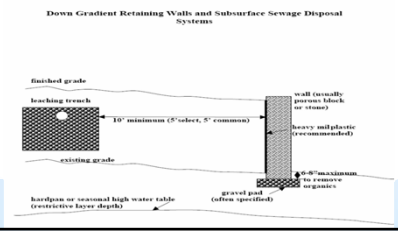
Leaching System: Retaining Walls

* SSDS design plans that include retaining walls shall provide retaining wall information and specifications including type of structure, groundwater control mechanisms (drains, weep holes), footings, and a cross section showing existing and proposed grades



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