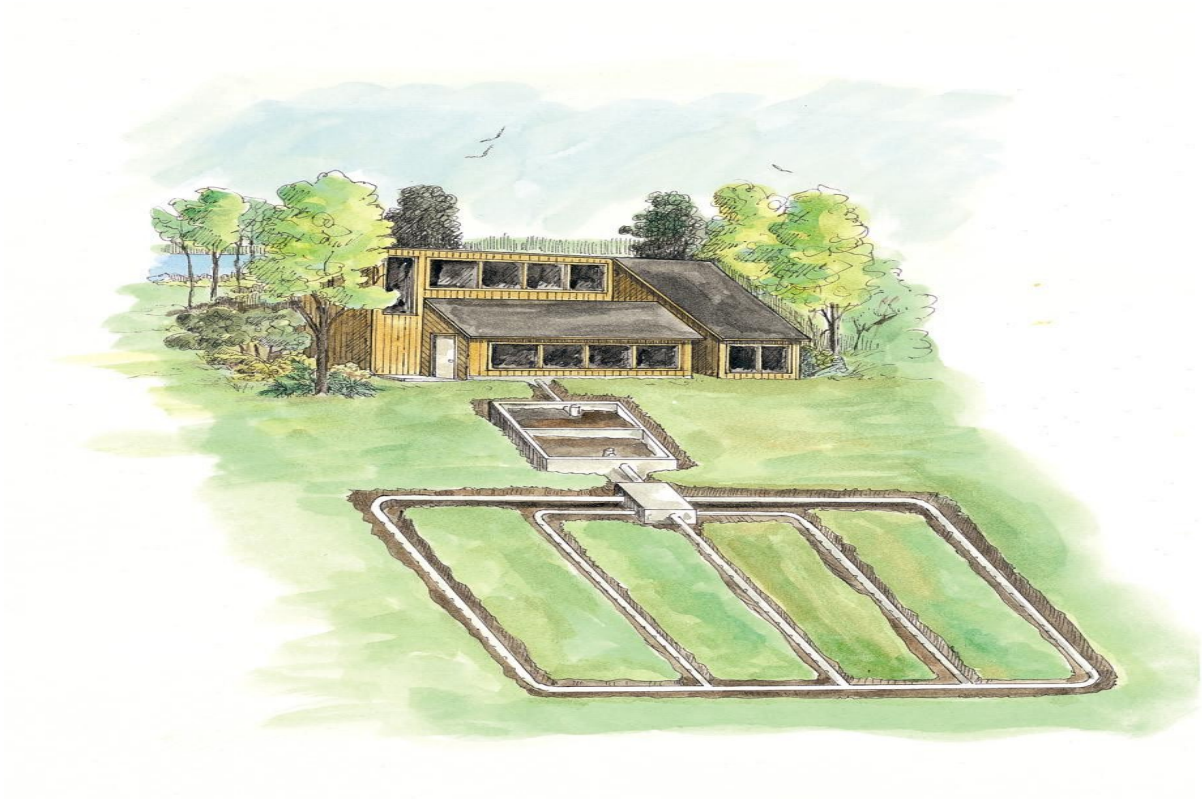
ON-SITE WASTEWATER TREATMENT SYSTEMS

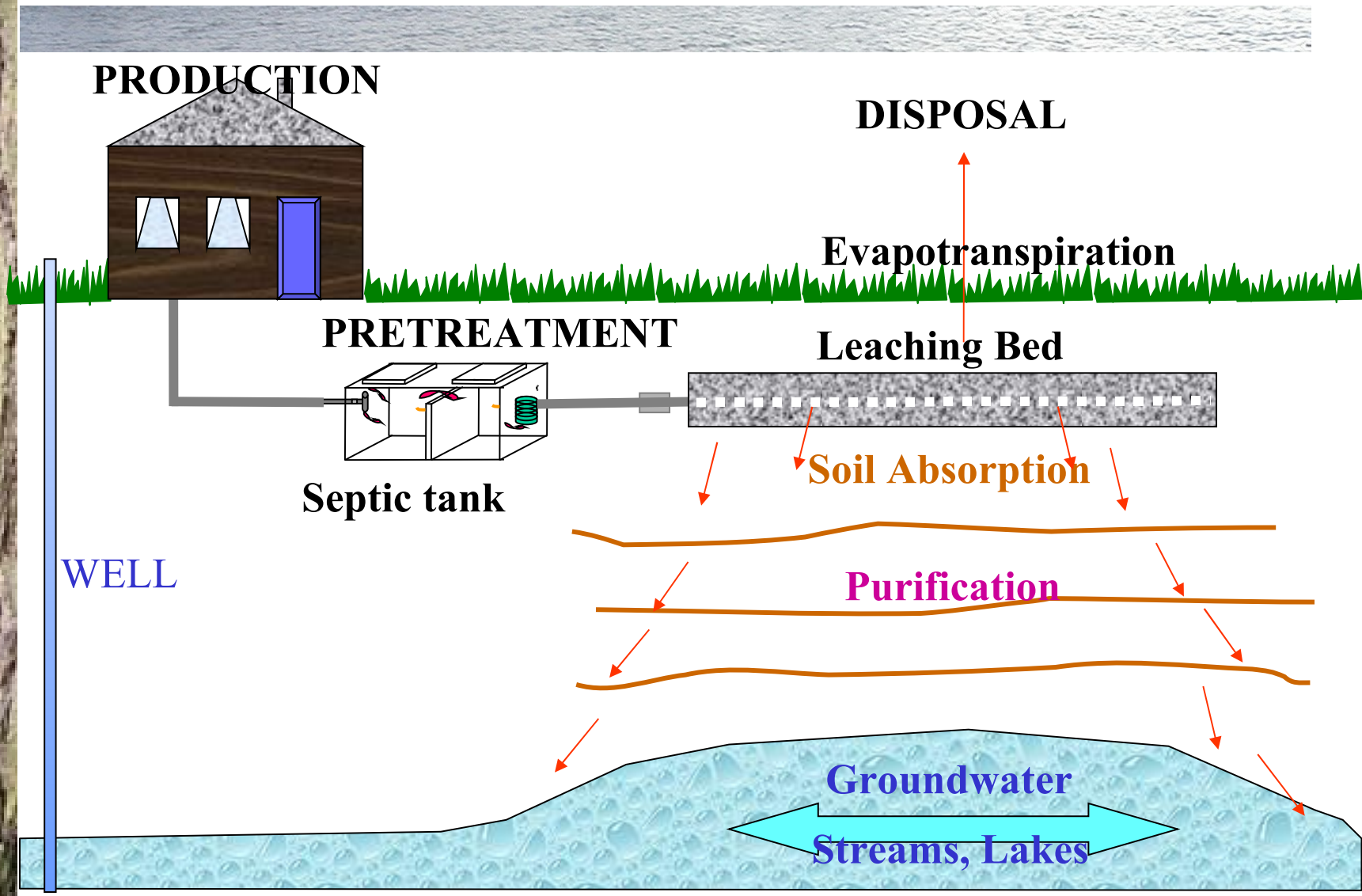
(IN THE OLD DAYS PREVIOUSLY REFERED TO AS SEPTIC SYSTEMS)



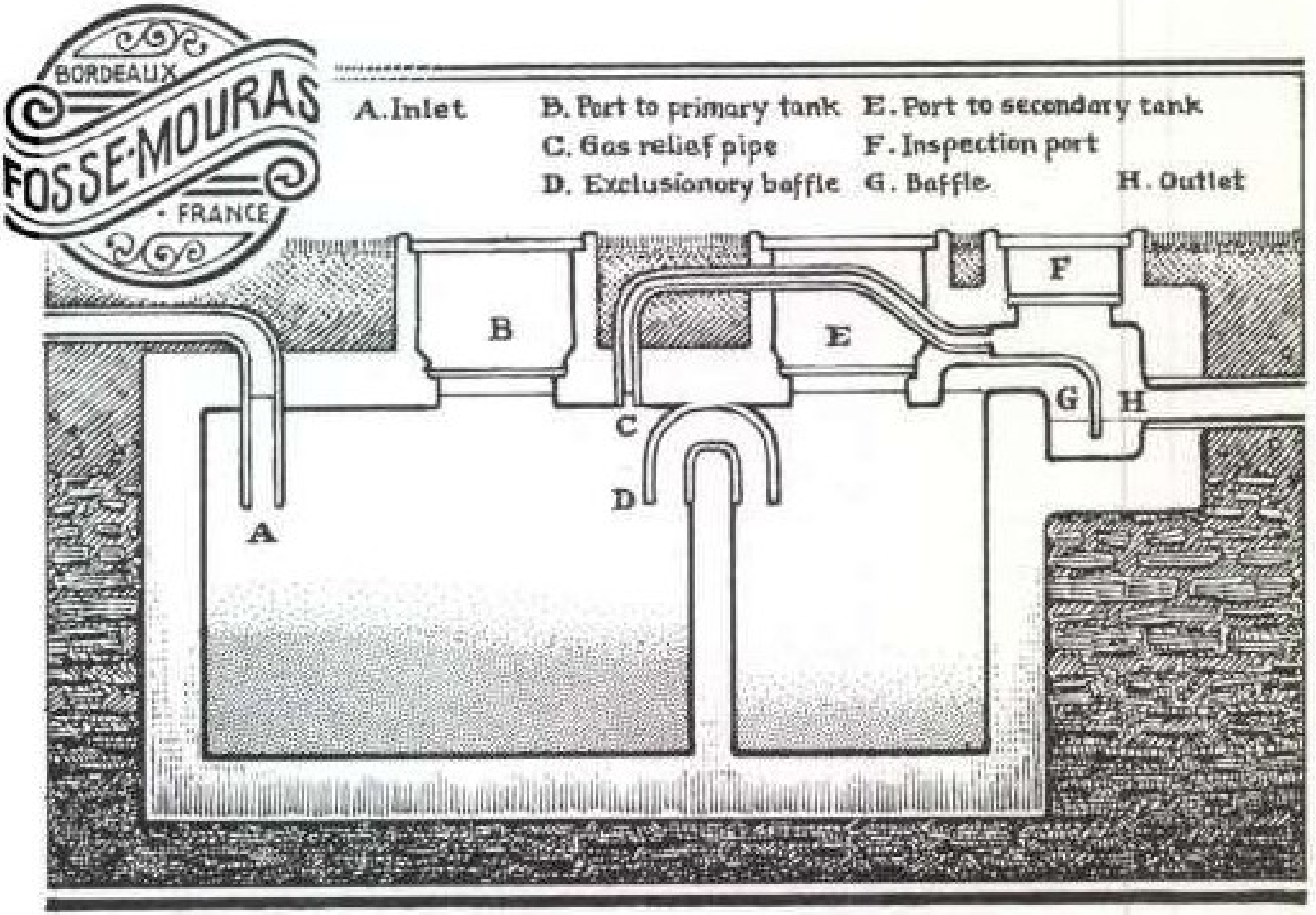
WHY USE AN ON-SITE WASTEWATER SYSTEM?

- normally rural homes, sub-divisions, and cottages outside of town or city boundaries rely on on-site treatment
- in Ontario, there are approximately 1.2 million on-site systems
- the most common type of on-site treatment system is the conventional septic system

WASTE TO WATER

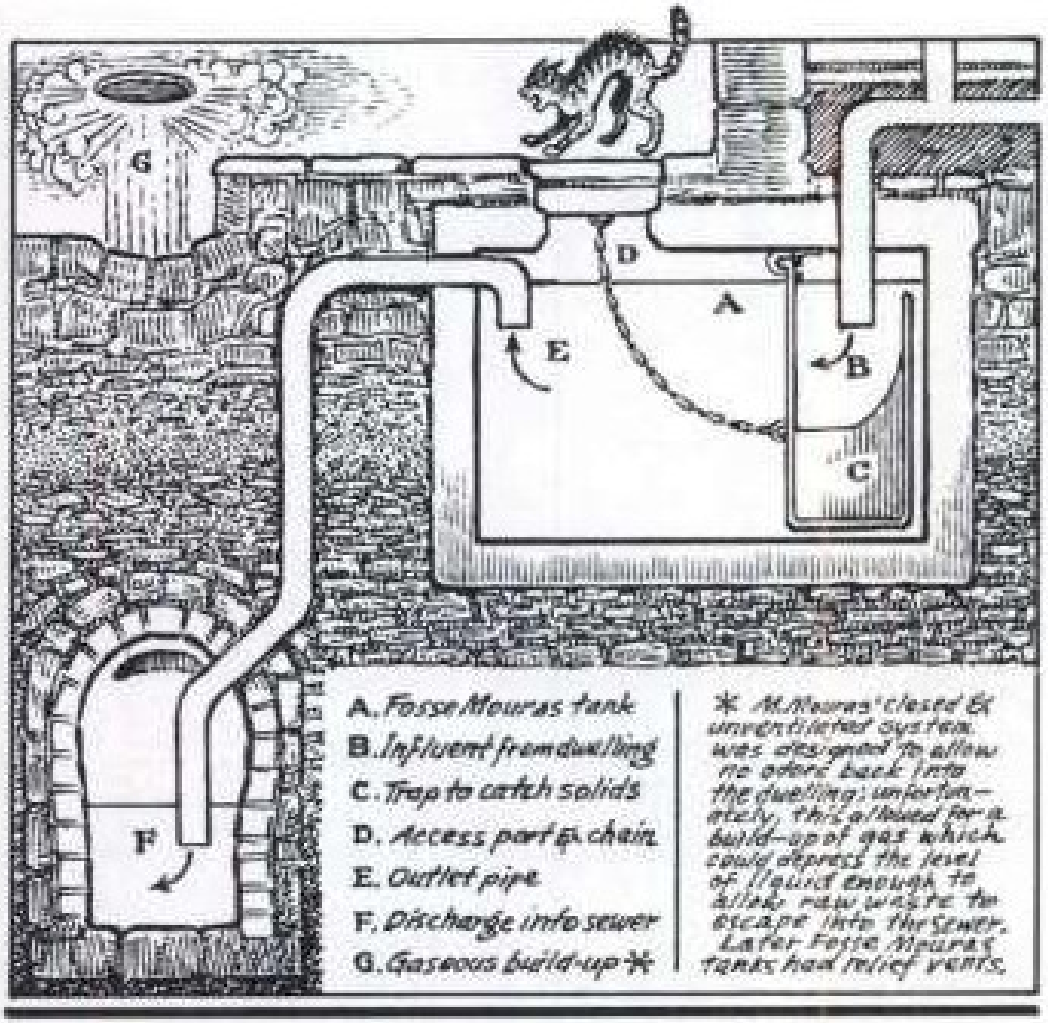


Tank Development – Late 1800s

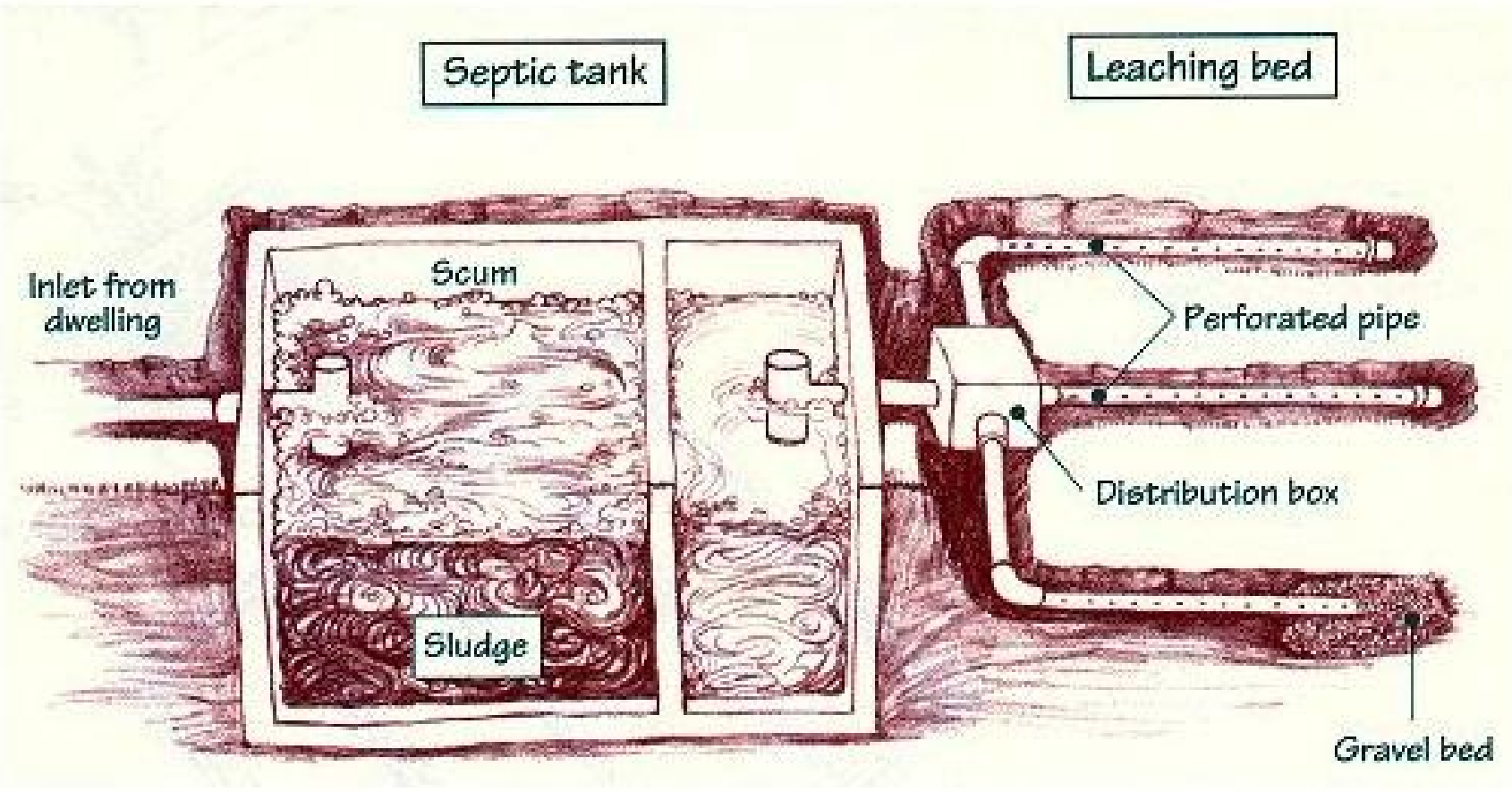


Early Decentralized Systems





What is a Onsite Wastewater Treatment System?



Septic System Capacity

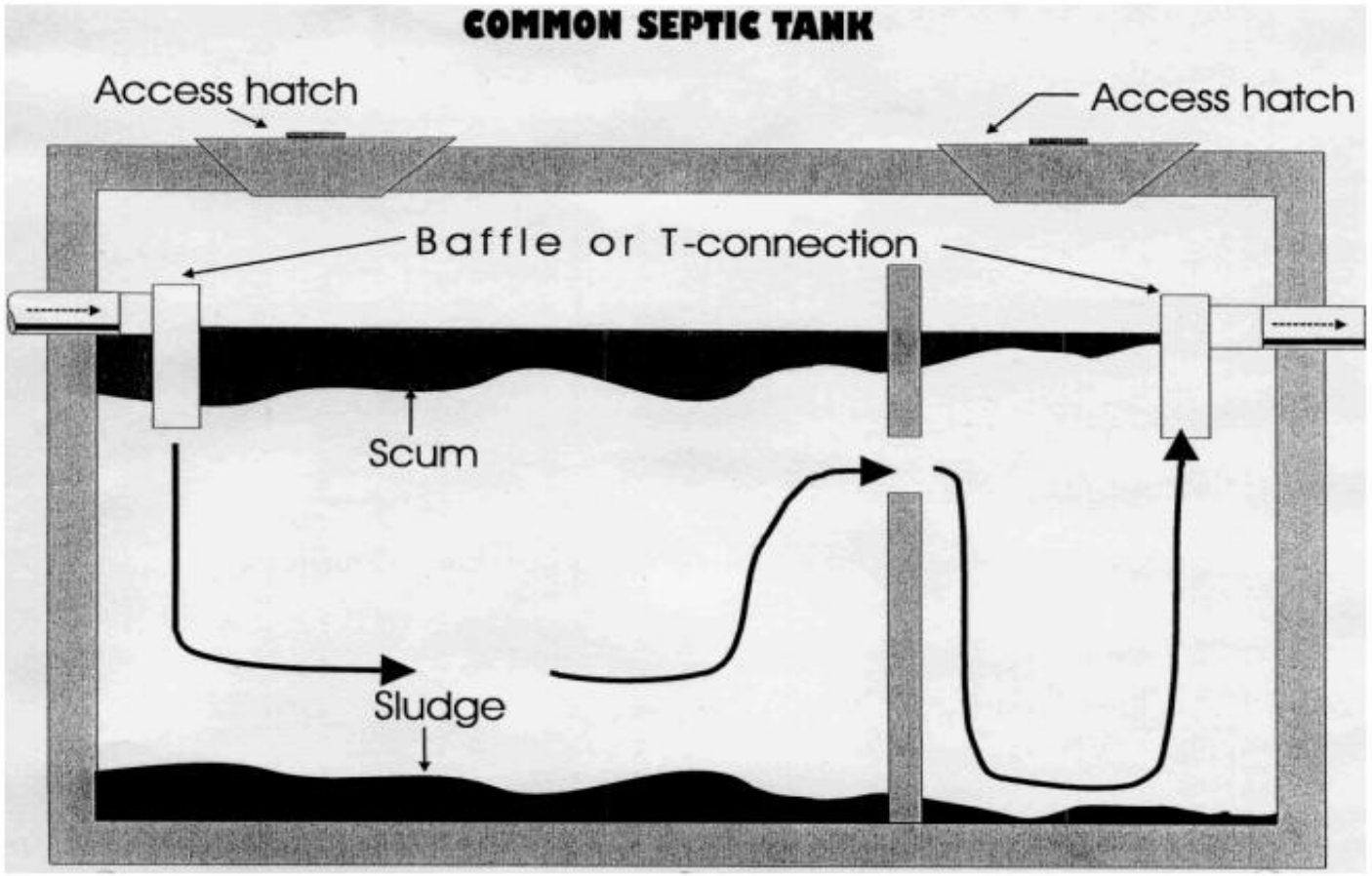
- Size of tank & leaching bed
  - 2 x estimated daily wastewater production or 3600 L (which ever is greater)
  - House size, # bedrooms, sinks, tubs, toilets, dishwashers, washing machines, water-using appliances

The Septic Tank

- Main components
  - Inlet pipe
  - Water & “good” bacteria
  - Compartments or chambers
  - Separation wall with central hole
  - Baffles
  - Effluent filter
  - Outlet pipe



Septic Tank Cross-Section



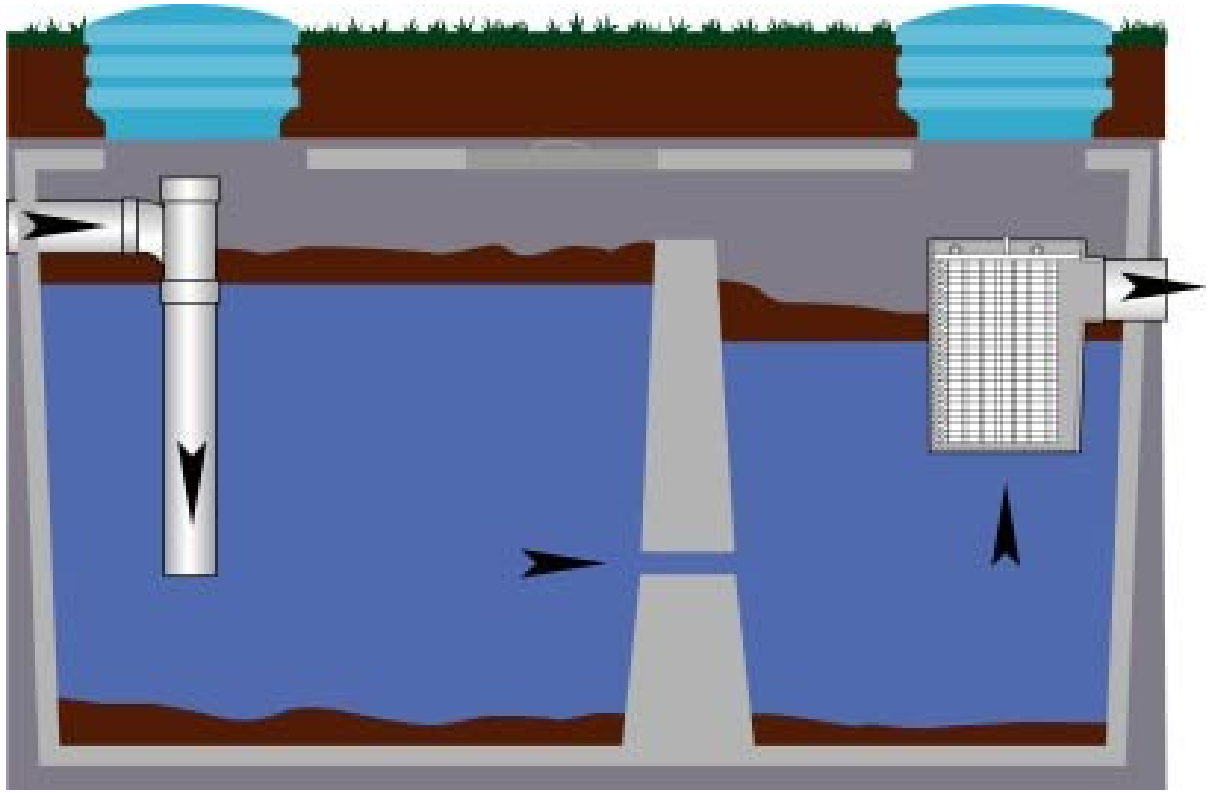
INLET BAFFLES



PARTITION WALL



New Building Code Requirement
Effluent Filters



Effluent Filter With Filter Media Disposal Bed

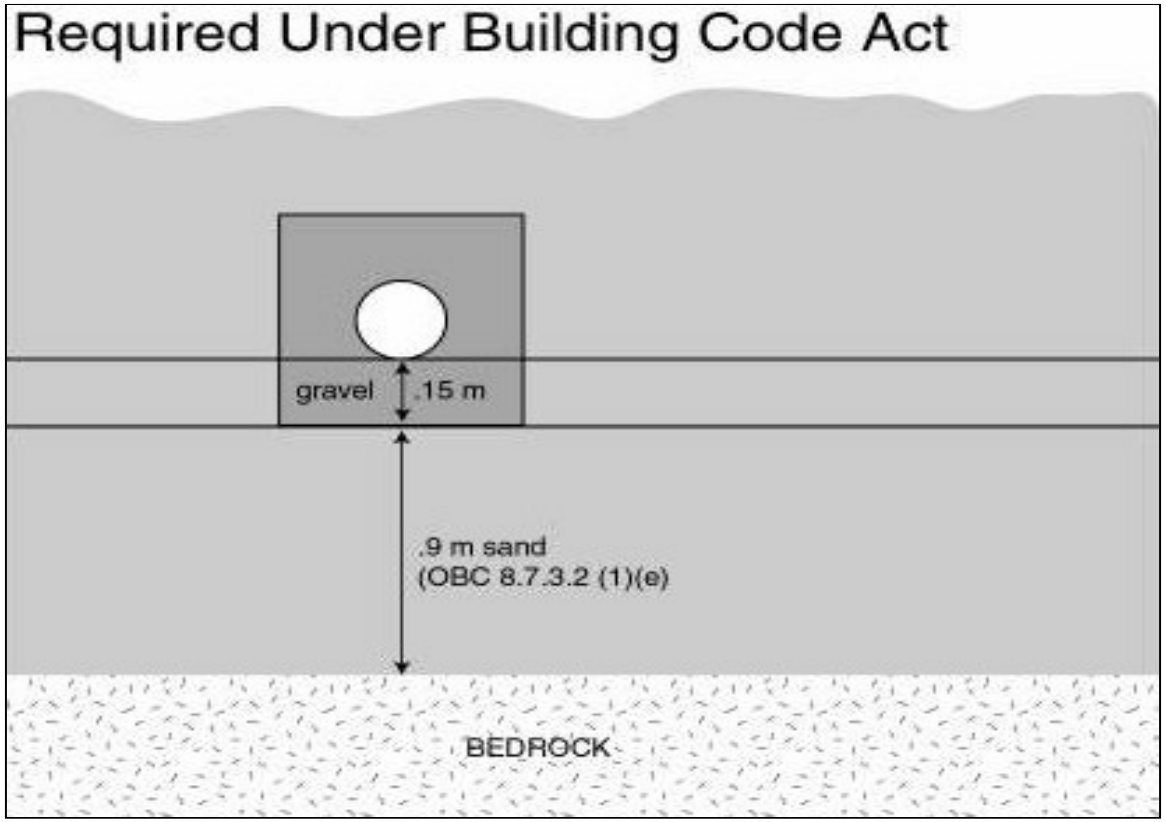


The Distribution System

- Distribution pipes



ABSORPTION TRENCH- CROSS-SECTION



STONE UNDER DISTRIBUTION PIPE



The Leaching Bed



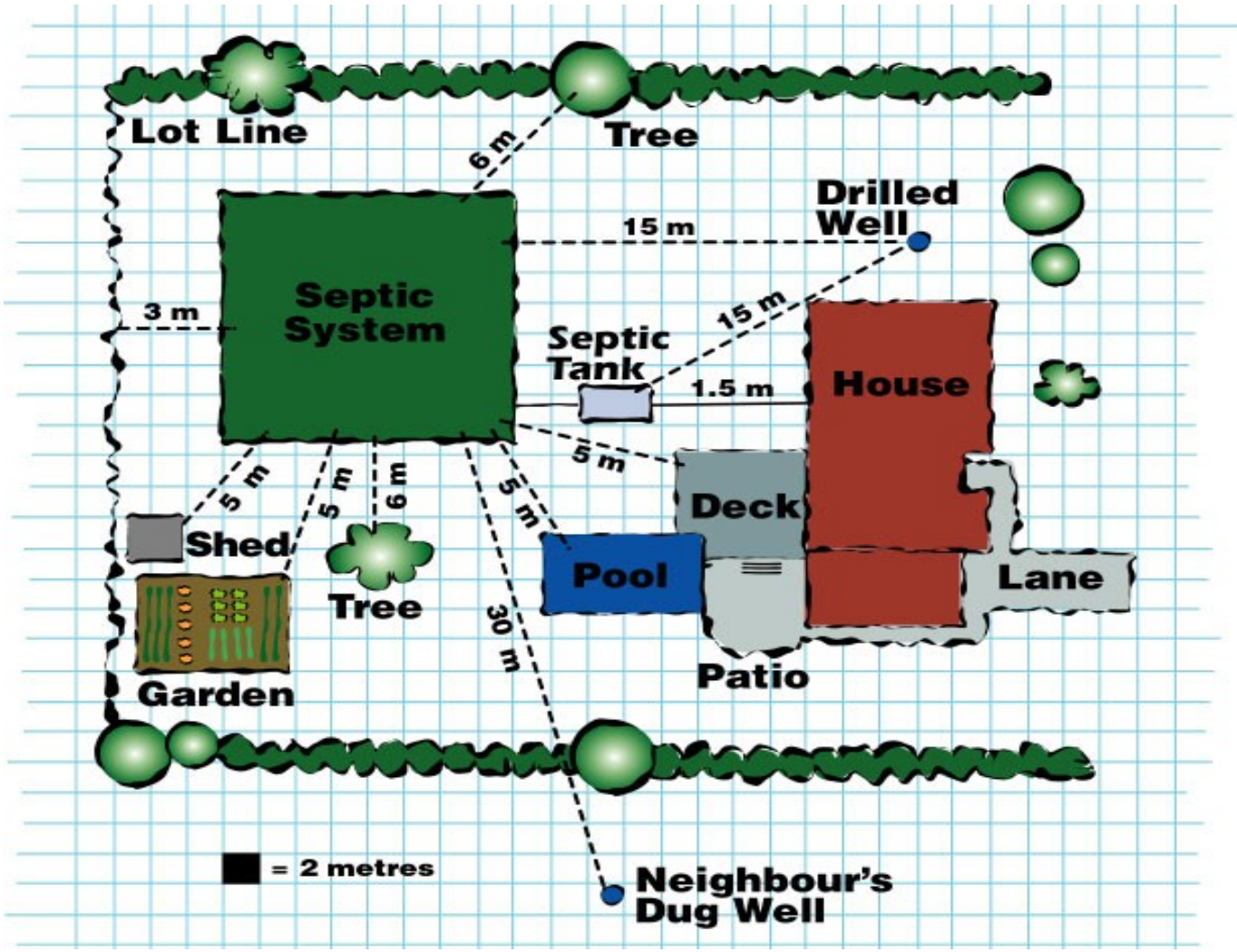
LEACHING BED WITH DIFFUSER CHAMBERS



Filter Media Disposal Bed



Location of a Septic System



Causes of Improperly Functioning Systems

Causes

- Improper construction or installation
- Undersized tank, or leaching bed area
- Poor maintenance
  - compacted soils
  - saturated leaching bed
  - poisoning of good bacteria
  - Usage patterns



Common Leaching Bed Problems

- Broken piping from septic tank
- Distribution box or header is off level
- Pumps not cycling properly
- Pump Floats fouled with grease
- Excess liquid getting to the ground surface
  - striping is symptomatic of this
  - ponding is the end product

Old Clay Tiles Plugged With Roots



Checking High Water Table



How Do You Know If You Have a Problem??

Symptoms

Soft & Spongy Ground Over Leaching Bed

Lush Patches of Grass Over Leaching Bed





Pools of Dark Water Over Leaching Bed

How Do You Know
If You Have a Problem??

Symptoms

Toilet & Drains Backing Up

Odours





Dangers of Improperly Functioning Systems

Effects

- Ground & surface water contamination (chemical and biological)
- Costly repairs or replacement
- Increased nutrient levels in the aquatic environment leading to increased vegetation growth and quicker eutrophication of the lake ecosystem
- Loss of property value

Proper Maintenance of System
Regular Pump-outs

- every 3-5 years (depends on system size and load)
- When scum and sludge equal >1/3 of total tank volume
- removes built up sludge
- prevents solids from exiting tank

Proper Maintenance of System
Regular Inspections

- Thorough inspection
  - annually
  - official septic inspector
  - certified septic installer/contractor
  - septic pump-out contractor
- Maintain access to hatches of tank
- Check scum/sludge levels, baffles, liquid levels and tank integrity
- Clean off effluent filter if required

Checking the Tank



- Have the tank pumped while present
- Check the scum and sludge depth for accumulation
- Check seal on tank lids
- Listen for water coming into the tank
- Check interior of tank

DO NOT ENTER THE TANK

Proper Care of System

- Protect your leaching bed
  - Avoid compacted soils
  - Avoid damaging pipes
  - Avoid saturation of leaching bed
- Control input
  - Practice water conservation through low-flow appliances and attention to usage patterns
  - Reduce solid waste

Unfriendly Items

- 2-3 ply toilet tissue or facial tissue
- Hair or dental floss
- Kitchen scraps
  - fats, oils or greases
- Chemical cleaners
  - drain cleaners
  - toilet sanitizers
- Medicines
- Cigarette butts
- Antifreeze
- Paints or solvents
  - nail polish remover
- Gas, motor oil or
- Septic additives (see next slide)

Additives

1. Starters
2. Feeders
3. Cleaners

- Do your research
- Not guaranteed to work
- Usually best results accomplished when accompanied by a period of bed resting
- Cost/Benefit?
- Adding cats, racoons, squirrels or groundhogs dead or alive will not help your septic system

ALTERNATIVE ON-SITE TECHNOLOGIES

- Not new to the wastewater treatment field
- Approved by the Building Materials Evaluation Commission
- Many options for almost every site situation imaginable including islands and small lots

SITE CONDITIONS

- COTTAGES TO FULL-TIME RESIDENCES
- PROXIMITY TO SENSITIVE LAKES AND RIVERS
- SHALLOW BEDROCK & HIGH GROUNDWATER TABLE
- CLAY SOILS
- SLOPED SITES

Approved New Disposal Methods

Area Beds

Shallow Buried Trenches

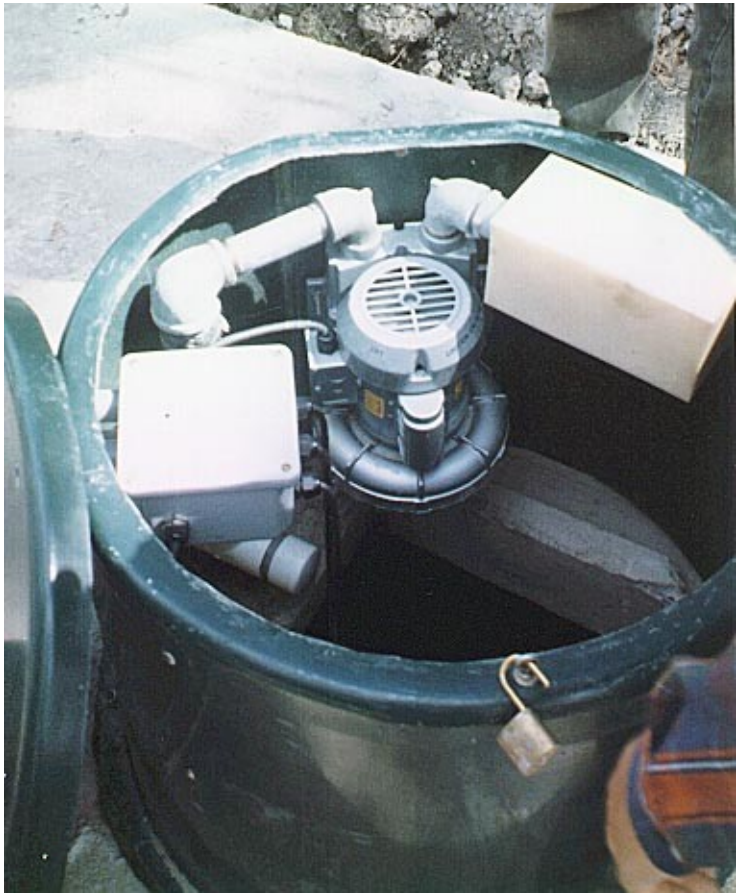
Shallow Buried Trench Disposal Method



Treatment Unit With Area Bed Disposal Method



Improving Performance
Aerobic Treatment Units



Treatment Unit With Shallow Buried Trench



Improving Performance

Waterloo Biofilter - Inground



Waterloo Biofilter - Aboveground



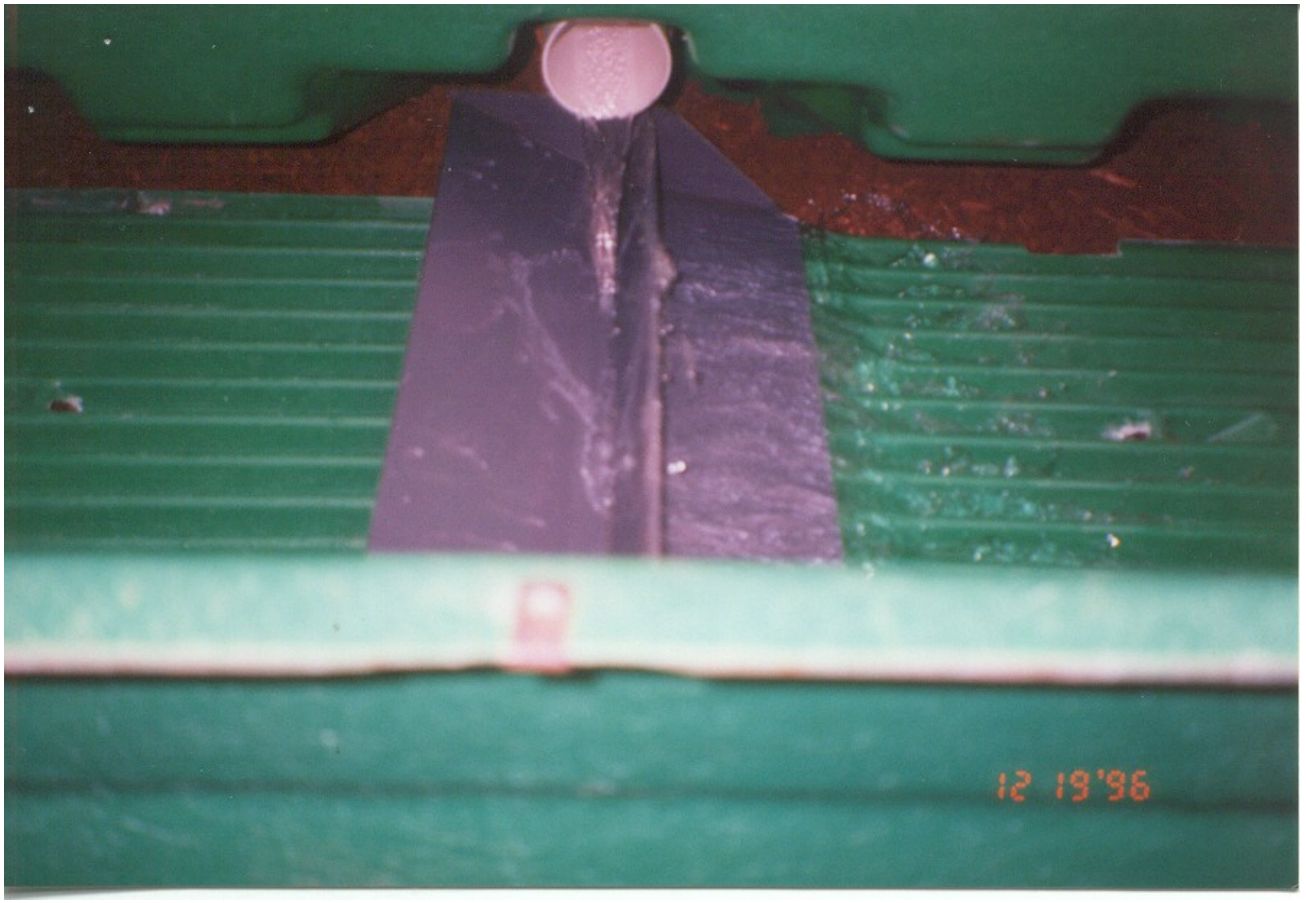


Improving Performance
Peat Filter System

- Bottomless, fibreglass shell
- Filtering layers
  - Peat
  - Crushed stones
  - Natural/existing soils
- Compact design
- Environmentally sensitive areas



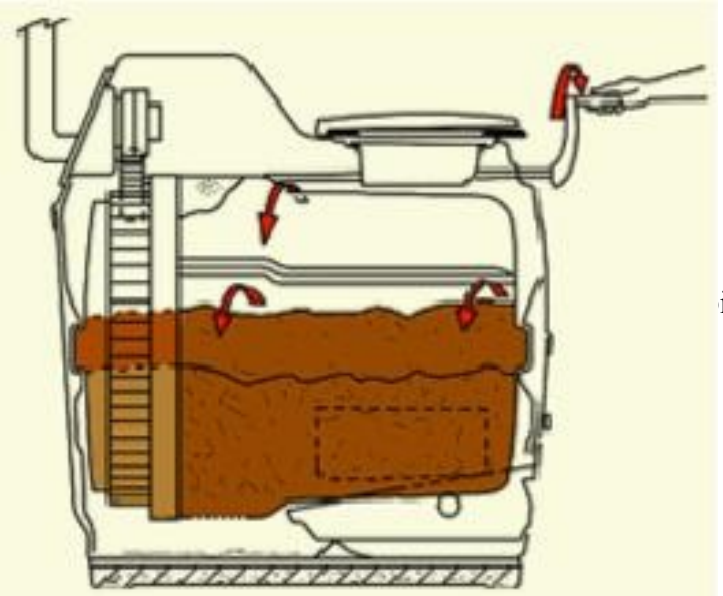
Ecoflo - Distribution System



Area Bed - Stone Layer



Composting Toilets





Composting Toilets

- Require continual maintenance (daily, weekly, monthly, yearly)
- May need to be connected to a Class 1 – Sewage System (cesspool)
- Usually combined with a greywater system of some variety
- Can be expensive
- Some people may object to a waterless toilet
- No permit required for installation
- A good alternative to an outhouse

Greywater Systems

- Class 2 – Sewage System under OBC
- No more than 1000 L/d
- Must have 0.6 m of soil on all sides and bottom
- Size based on a sidewall loading rate calculation
- No pre-treatment required under OBC

Take Action

- Know your wastewater system
  - Where it is & how it works
  - Be alert to changes
- Prevent problems (before they start)
  - Control what goes into your system
  - Proper maintenance
  - Regular inspections
  - Research, learn & share information
  - Initiate a re-inspection program

Cottage Specific Concerns

- Seasonal shutdown of sewage system (removing pumps, draining lines, frost protection)
- Peak loading of marginal systems can cause breakout/periodical bed failure and contaminants at surface
- Septic systems operate the most effectively after a period of sustained continual use, not the case for most cottage properties

Questions?

- Contact your local septic inspector
- Check with the local Health Unit/Conservation Authority or Municipality as to who provides regulatory services in your area.

Jamie Saunders

MRSSO Inspector/Re-inspection Co-ordinator

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THE END

SOURCES OF INFORMATION

www.uoguelph.ca

www.oowa.org

Ontario Rural Wastewater Centre

