Diagnosis Septic

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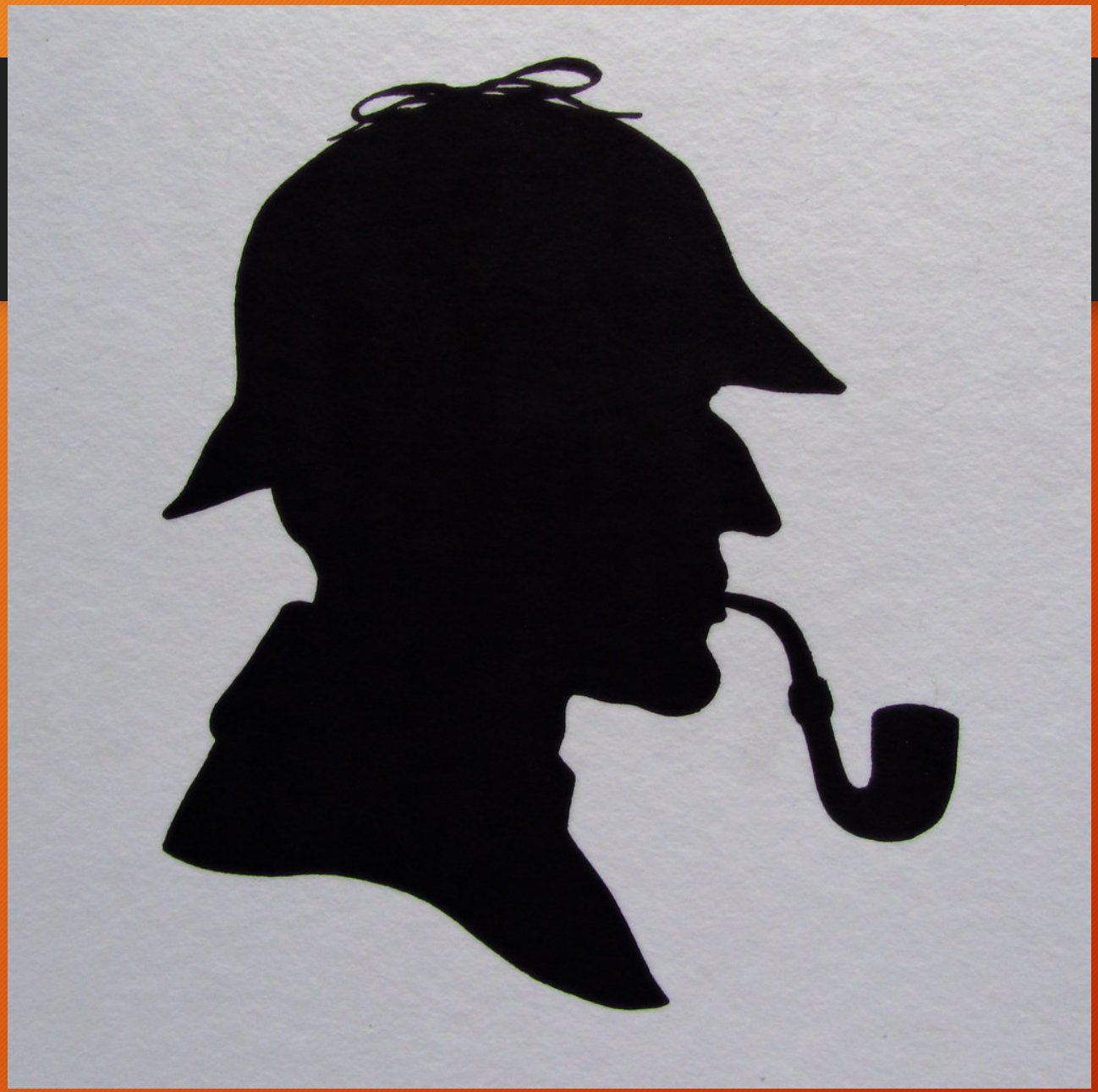
Conventional septic systems as well as alternative technologies may occasionally experience operational issues caused by use/misuse issues and/or mechanical problems. This presentation will present an optional approach to investigating potential causes, determining next steps and making corrections before failure of the septic system, including some case studies and an opportunity for attendees to share some of their own experiences.

DISCLAIMERS

- Reference to any proprietary technology in this presentation or in response to a question does not constitute a comment on or endorsement of the technology by the presenter or MassDEP.
- This presentation relates solely to 310 CMR 15.000, Title 5 of the State Environmental Code. Municipalities may have regulations that are more restrictive than Title 5.

Discussion Points

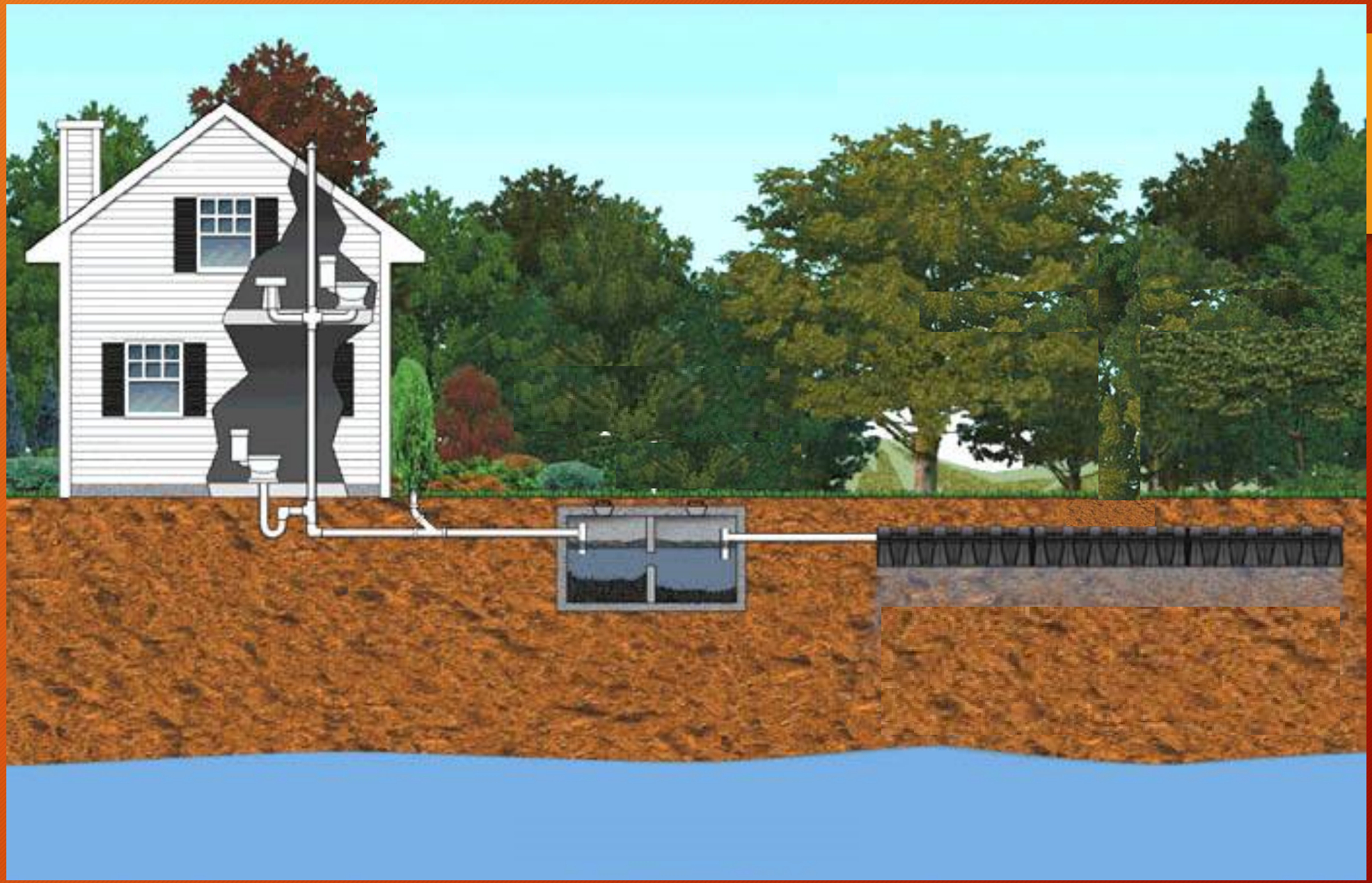
- Very brief septic system overview
- Five-step troubleshooting process
- Some generic problems
- Case studies
- Additional factors to consider
- Questions/discussion



The process starts upon the supposition that when you have eliminated all which is impossible, then whatever remains, however improbable, must be the truth. It may be that several explanations remain, in which case one tries test after test until one or other of them has a convincing amount of support.”

Sir Arthur Conan Doyle
The Adventure of the Blanched Soldier

Septic System Overview



Five-Step Troubleshooting Process

Adapted from *odesie* (Online Dynamic Enterprise Solutions for Industry Excellence)

The Steps

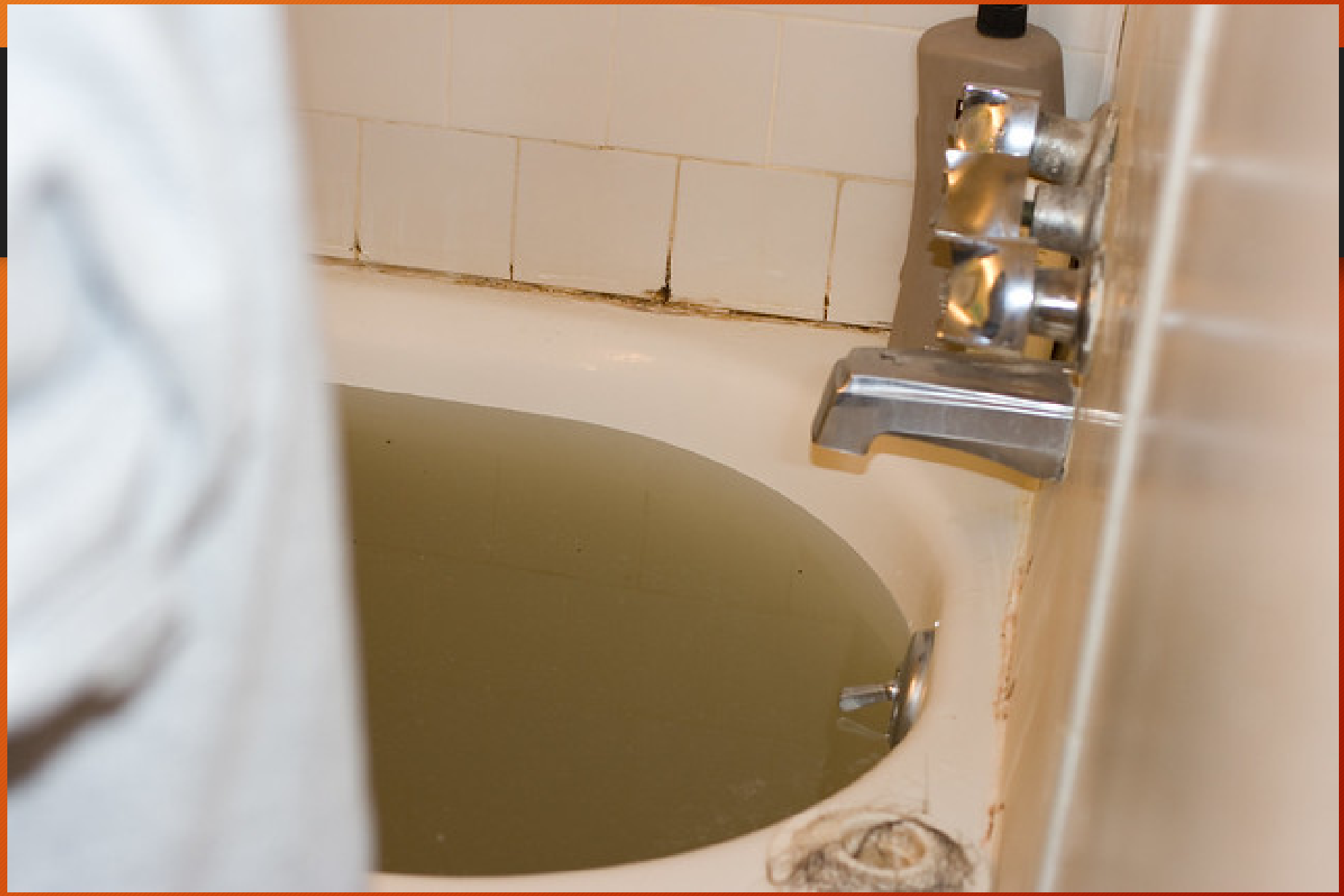
1. Verify that a problem actually exists.
2. Investigate and find the cause(s) of the problem.
3. Correct the cause(s) of the problem.
4. Confirm that the problem has been fixed.
5. Follow up to prevent future problems.

Some Generic Problems


PROBLEMS
AHEAD
CAUTION

Problem: Backup of Sewage Into Home

1.



2a. Possible Causes

- Blocked house plumbing
- Blocked/collapsed building sewer
- Blocked septic tank outlet
- Malfunctioning pump
- Clogged SAS

Let's leave this until later!

2b. Routes of Investigation

- Run fixtures individual
- Isolate those fixtures not discharging or backing up
- Look in septic tank:
  - Receiving flow?
  - Discharging? Is there blockage or is there back-up?
  - Tee Filter?
- Is pump activating as it should? Alarm?

3. Correct the problem(s)

- If only some fixtures backup, likely plumbing issue (If only to “low” fixtures, may still be septic issue)
- If septic tank is not receiving all the flow: plumbing and/or building sewer issue
- If septic tank outlet is blocked or tee filter is not maintained, have septic tank pumped and filter cleaned and monitor
- If pump is issue, have it serviced and require maintenance

4. Confirm problem(s) fixed

- Is septic tank receiving flow?
- Is d-box or pump chamber receiving flow?
- Is d-box providing equal distribution?

5a. Follow-up to prevent future problems

- Identify the problem to the property owner
- Educate the property owner on cause and effect

5b. Identify cause to property owner

- Blockage in plumbing or building sewer:
  - Oil/grease
  - Wipes
  - Inappropriate disposal of non-flushable items
  - Broken/crushed pipe
- Inadequate maintenance of septic tank and/or filter
- Malfunction and/or inadequate maintenance of pump and alarms

5c. Educate property owner and public

MassDEP

- https://www.mass.gov/septic-systems-title-5
- https://www.mass.gov/guides/caring-for-your-septic-system

EPA

- https://www.epa.gov/septic/septic-systems-overview
- https://www.epa.gov/septic/new-homebuyers-brochure-and-guide-septic-systems
- https://www3.epa.gov/npdes/pubs/homeowner_guide_long_customize.pdf

Problem: Breakout/Ponding of Sewage

1.

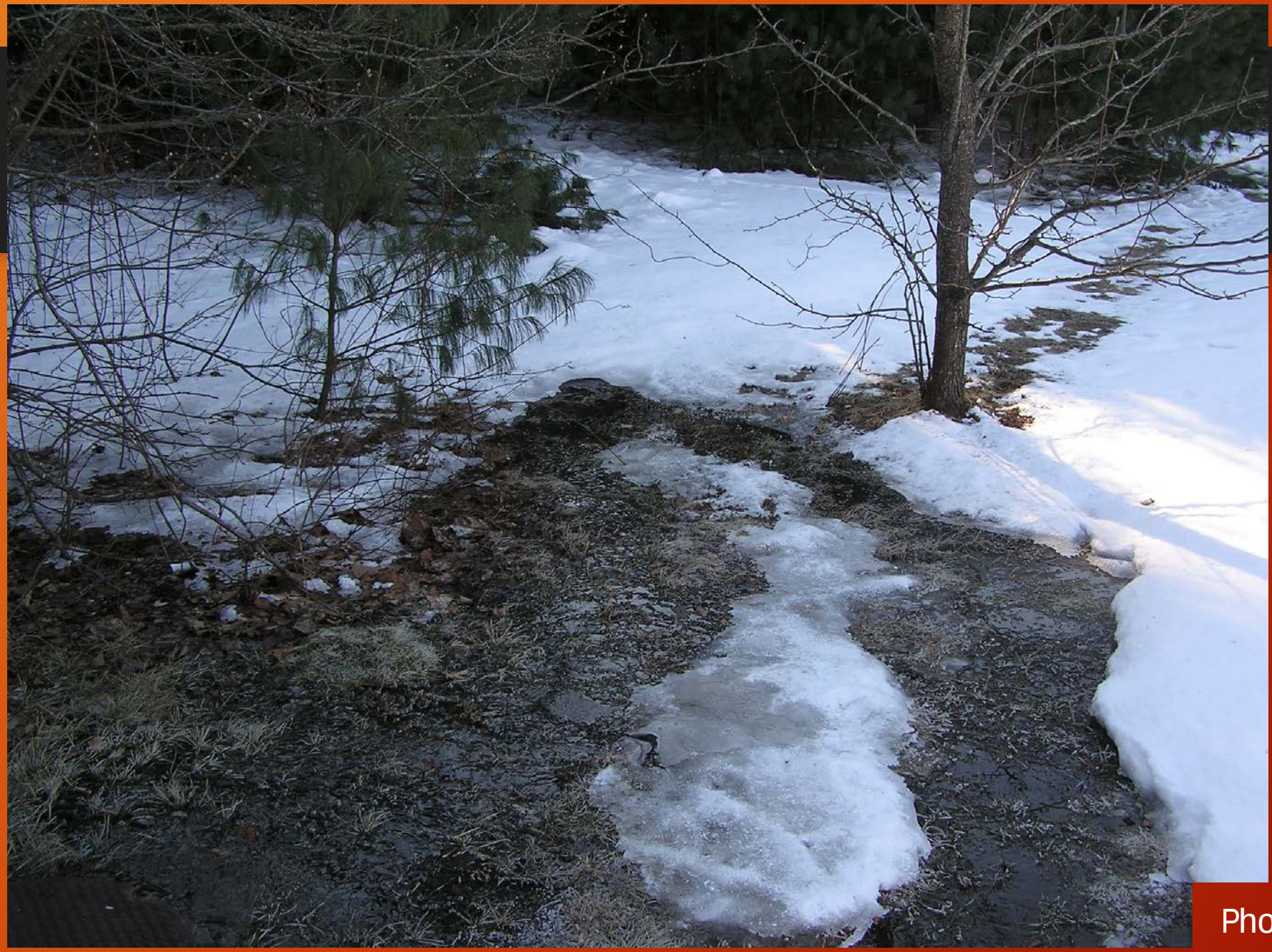


Photo Credit: C. Golden

2a. Possible Causes

- Unlevel d-box
- Blocked outlet(s) in d-box
- Solids carryover from septic tank
- Biomat not permitting flow into the soil
- Hydraulic overload

2b. Routes of Investigation

- Open d-box and determine if properly operating
- Open observation port (if available)
- Confirm if sewage
  - Smell
  - Look
  - Test if needed
- Define area of ponding and/or breakout; Isolated? Overall?
- Locate nearby drainage

3. Correct the problem(s)

- Level / fix d-box and outlets
- Consider options
  - Design issue?
  - Installation or materials issue?
  - Approved restorative technology?
  - Full upgrade?
  - Interim measures?
  - Time frame?

4. Confirm problem(s) fixed or is it?

- If not an upgrade, it may just be a temporary patch.
- If problems persist:
  - Is it the same original issue; and/or
  - Has something new surfaced?
- Without and sometimes even with an upgrade, you may feel like you are chasing your tail.
- Just work though it the best you can.

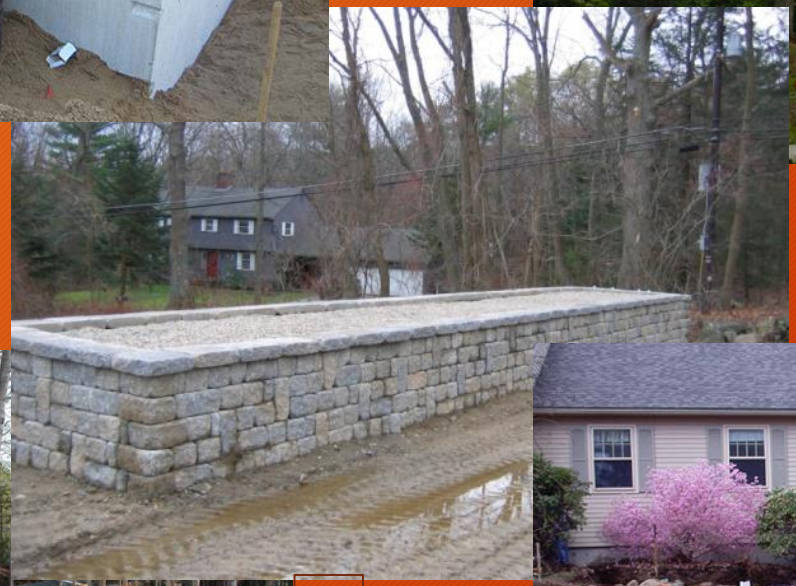
5. Follow-up to prevent future problems

- Identify the problem to the property owner*
- Educate the property owner on cause and effect*

* As appropriate, refer back to Slides 19 and 20.

Problem: Alternative Technology Malfunction

A



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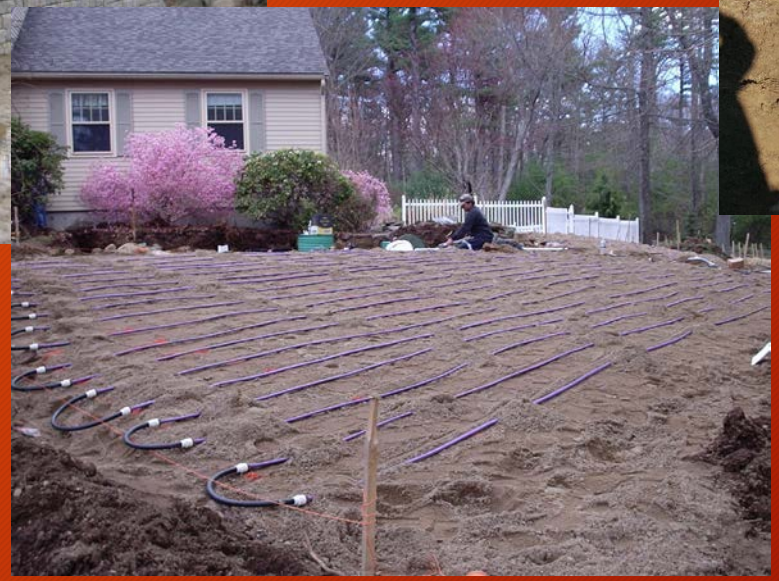

E

Photo Credits:
A – Waterloo Biofilter
B – Presby Environmental (Infiltrator)
C – C. Golden
D – Bioclere
E – C. Golden
F - Biomicrobics

2. Investigate and Identify Cause(s)

- If non-passive treatment, what does WWTO say?
- Has field or lab testing been within limits?
- If not, what are potential causes?
- Is additional testing required? pH? Hardness?
- If treatment is provided, is it the treatment process or the SAS or both?

3. Correct the problem(s)

- Modification of wastewater practices
- Modification of I/A to address issue
- Replacement or supplementation of system component(s)

4. Confirm problem(s) fixed

- Additional testing
- Testing for additional parameters
- Monitoring of observation port if appropriate

5. Follow-up to prevent future problems

- Identify the problem to the property owner
- Educate the property owner on cause and effect

Additional Factors to Consider

Impactful non-typical issues

- Medical conditions and treatment:
  - Chemotherapy
  - Heavy-duty antibiotic treatment
- Cleanliness and sanitization/disinfection
  - Laundry
  - Floor cleaners and disinfecting product use
- At-home business or craft disposal
  - Paints
  - Varnishes
- Personal dietary habits

How to address them

- Offer general information regarding medical issues;
- Suggest spreading out laundry and sanitizing over multiple days;
- Suggest non-quaternary cleaners for floors;
- Explain that paints and varnishes (even eco-friendly ones) should be disposed of elsewhere; and
- Offer general information that some special diets may not supply I/A units with diet that the microorganisms need.

A Few Case Studies

Some with solutions and some without (for the time being)!

Scenario #1

Maintenance person at an elderly housing complex notices that the wastewater in one of the septic tanks is grey when he goes to clean the effluent tee filter. Other than that, the system appears to be operating well.

Despite its purpose, kitty litter should not be flushed.

Scenario #2

A relatively new septic system serving a church was having issues. The church had monthly fried chicken dinners. The designer found out that the oils from the frying were being disposed of down the kitchen sink (no grease trap). The designer directed the church to not put the oil down the sink but the problems continued. When the person in charge of the dinners was questioned she swore that she was no longer dumping the oil down the sink.

But she was flushing it down the toilet!

Scenario #3

A home in a historic district had a system upgrade with a JET unit followed by Perc-Rite drip dispersal. Isolated ponding pockets in areas of emitters resulted. The entire SAS has twice been replaced with technology supervision and different sand providers. There still is a little ponding which “chimneys” up from one emitter. JET system is properly operating as is the Perc-Rite.

The verdict is still out on this one….Stay tuned!

Let’s talk about some of your cases….

Questions

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THANK YOU