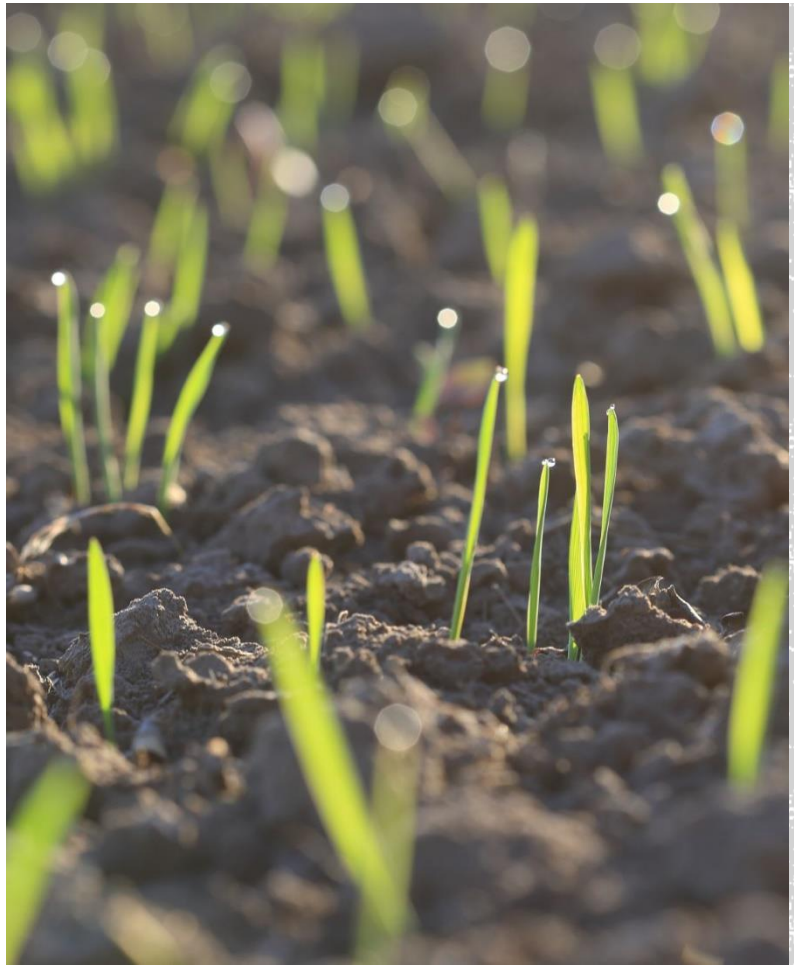

Drip Irrigation 101

Designed & Presented By Nicholas Dykes

Information Statement

- ***The information contained in this presentation is from work experience gained in the field by Nicholas Dykes, A Licensed & Insured OWTS Installer.***

- ***Pictures Herein were captured for this presentation by Nicholas Dykes.***

- ***The materials in this presentation represents the Opinion of Nicholas Dykes, the material does not reflect the opinions of NOWRA, State Affiliates or other Parties.***

Drip Irrigation is not new.

In use in Israel for over 100 years!

In use in United States in Agriculture for nearly 50 years.

Drip Irrigation Wastewater History

- Used for Onsite Wastewater in the United States for over 25 years.
- Came to the State of Missouri only 2 years after its National Debut. .

Popularity of Drip Systems

- Drip Irrigation Systems have become a popular option for engineers and installers since their introduction in the United States.
- They solve many of the obstacles that are faced when trying to treat and dispose of wastewater onsite.
- Home sites we are building on have gotten smaller and the majority of the good lots were built out in the past. Often Drip is our only option.

Why Drip?

- Limiting Conditions
- Limited Available Soils
- High Water Tables
- Bedrock
- Poor Soils/IVB Clay Soils
- Small Lots

Why Drip?

- Using Drip Irrigation can overcome and provide adequate vertical Separation from these limiting Condition.
- By Staying in the Upper Horizon of the Soil with our application, dispersal is in the Good Soil.
- Drips Application Rates can be very low for the poorest of soils. (0.05)

- Notice how shallow the Placement of the lines are.
- Where the good Soil lives
- Evapotranspiration is peak in these soils

Why Drip?

- Drip Systems can be form fitted to Small Lots and around Landscape.
- Drips are flexible in design.
- Engineers/Designers get creative to make use of all available space.

Soil Placement Options

Shallow Placement

Deep Placement

Mound Placement

DRIP COMPONENTS

What makes a Drip a Drip?

Pre-Treatment Tanks

- Some Rules, Regulations, and Manufacturers allow for Septic Drip, In this case we see a traditional Septic Tank, Single or Two Compartment, with an effluent filter preceding the pump tank.

- However, an Aerobic Treatment Unit is most common and generally what is installed before the pump tank to get the highest quality effluent possible.


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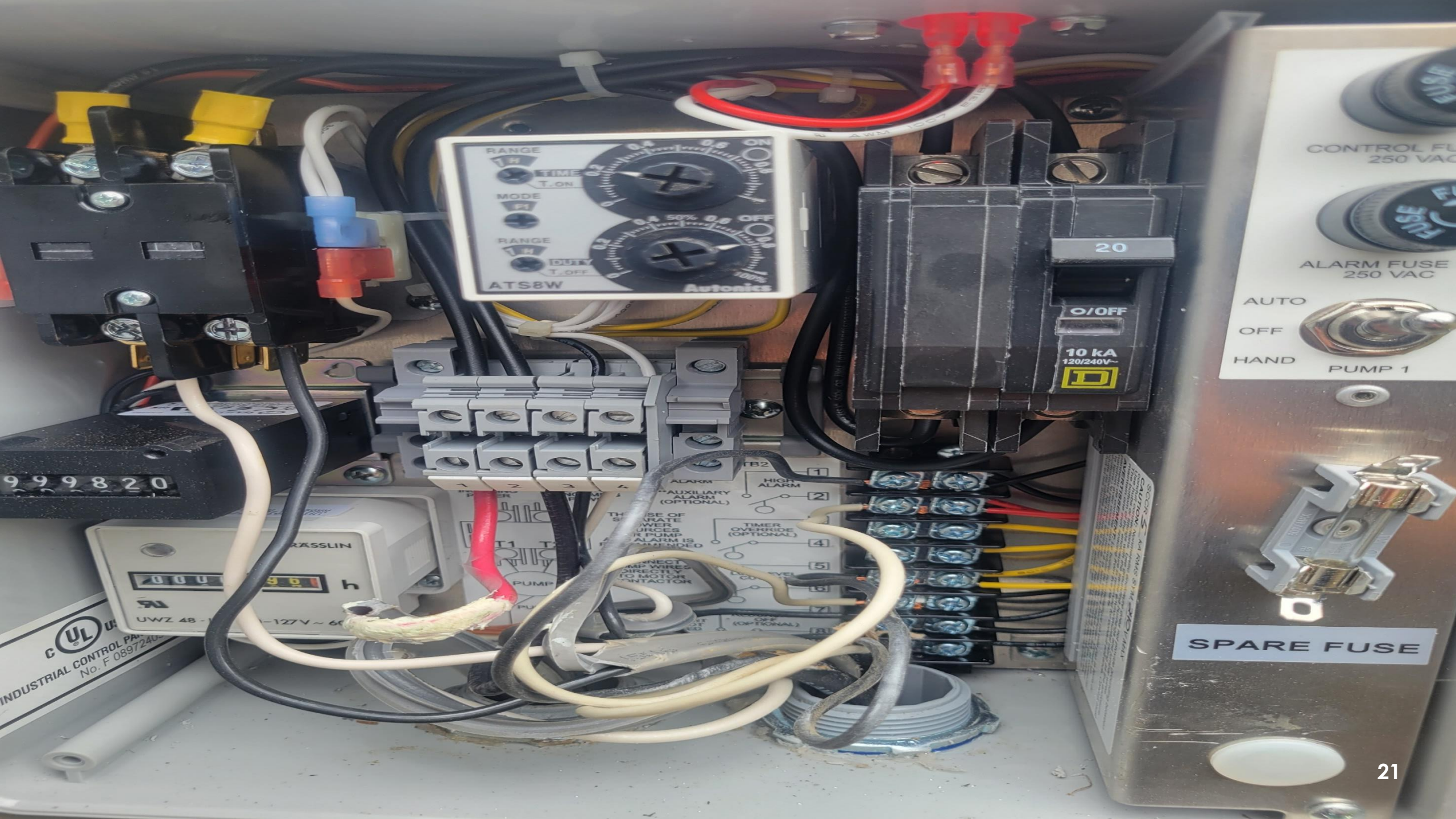
Lift Station/ Pump Tank

- Pump Tanks are the heart of the Drip System.
- Pre-treated effluent enters and then is discharged from this tank to our drip dispersal system.
- Often has many components of the System installed into the tank for ease of service and convenience.
- Crucial that the tank is watertight.

Control Panels

- Pump Control
- Cycle Counters
- Alarms
- Timers
- Breakers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TIMER OVERRIDE (OPTIONAL)
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High Head Pumps

High Head Effluent turbine Pumps are generally used.

Filters

- Disk Filter
- Screen Filter
- Serviceable part, need to be cleaned or changed often to prevent plugging
- Self Cleaning

Switching Valves

- Switching Valves for Multi Zone Fields
- Every Dose, or every other dose goes to a different zone in the field.
- Extending rest periods between doses even longer

Drip Tubing

- Wastewater Dispersion
- Emitters
- Root Guard (Some)
- Flow Rate (Variable)

Vacuum Breakers

- Serviceable Part
- Close system from air when pump kicks on to pressurize field
- Open to allow air in field when pump kicks off
- Helps field to drain back to pump tank when not in a live cycle
- Schrader Valve to check pressure at top of field
- Crucial that Installed at highest point of Field

Flush Valve Assembly

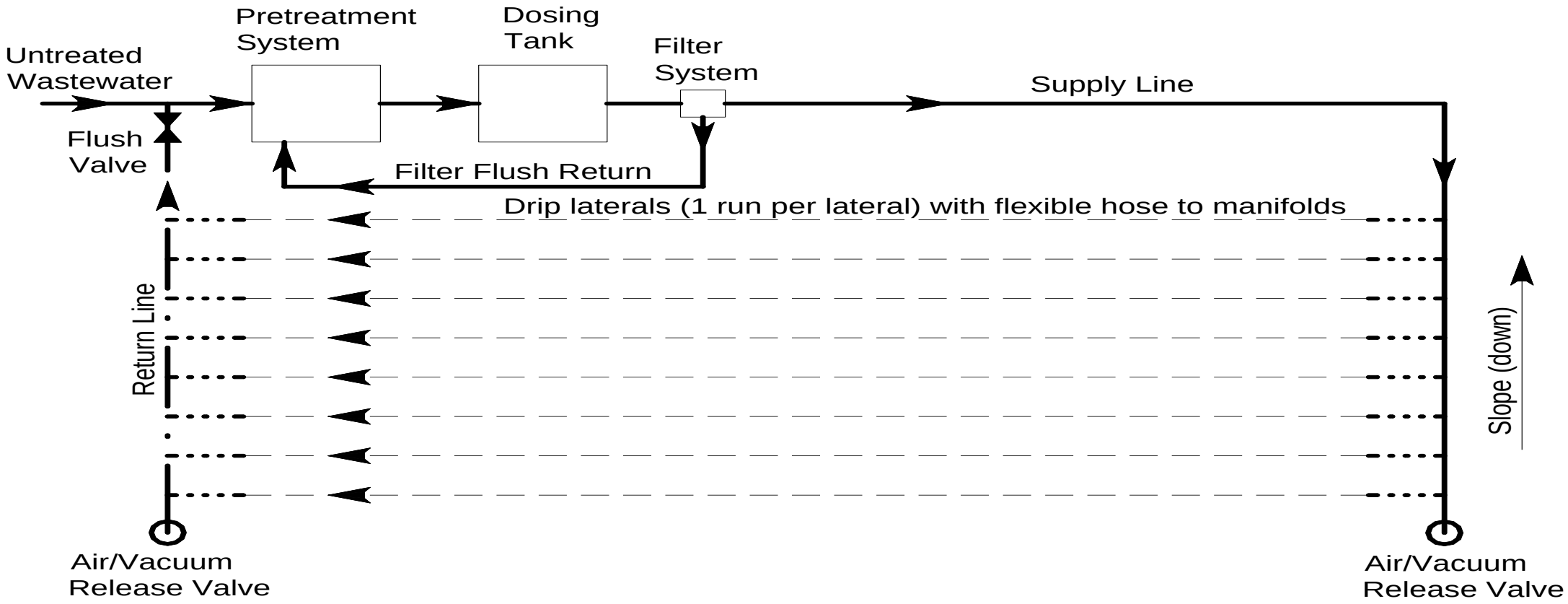
- Usually at end of zone on return manifold
- Most will be simple ball valves in Residential systems
- Has Schrader Valve to check pressure at end of field
- Used to control pressure in Field

Simple Ball Valve Flush Assembly

Manifolds

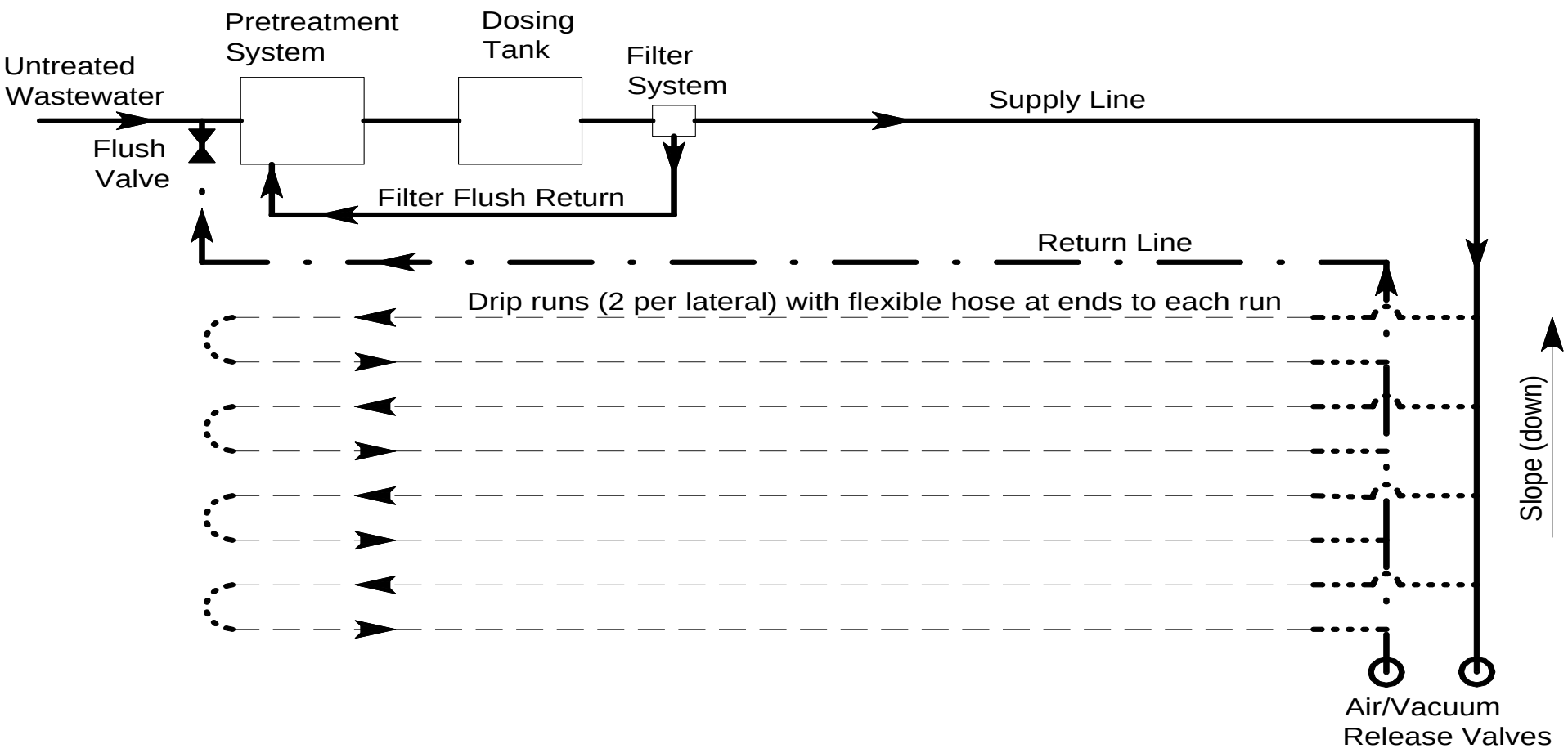
- Split manifold with Dedicated Trench for Pressure manifold, Dedicated ditch for return manifold
- Looped System with return and pressure manifold in same ditch
- Care must always be taken to allow for drainback in manifold plumbing
- Tedious plumbing, Workmanship Shows

Simple/Split Manifold Design



Layout with Single Runs for Each Drip Lateral

Looped Manifold Design



Layout with Two Runs for Each Drip Lateral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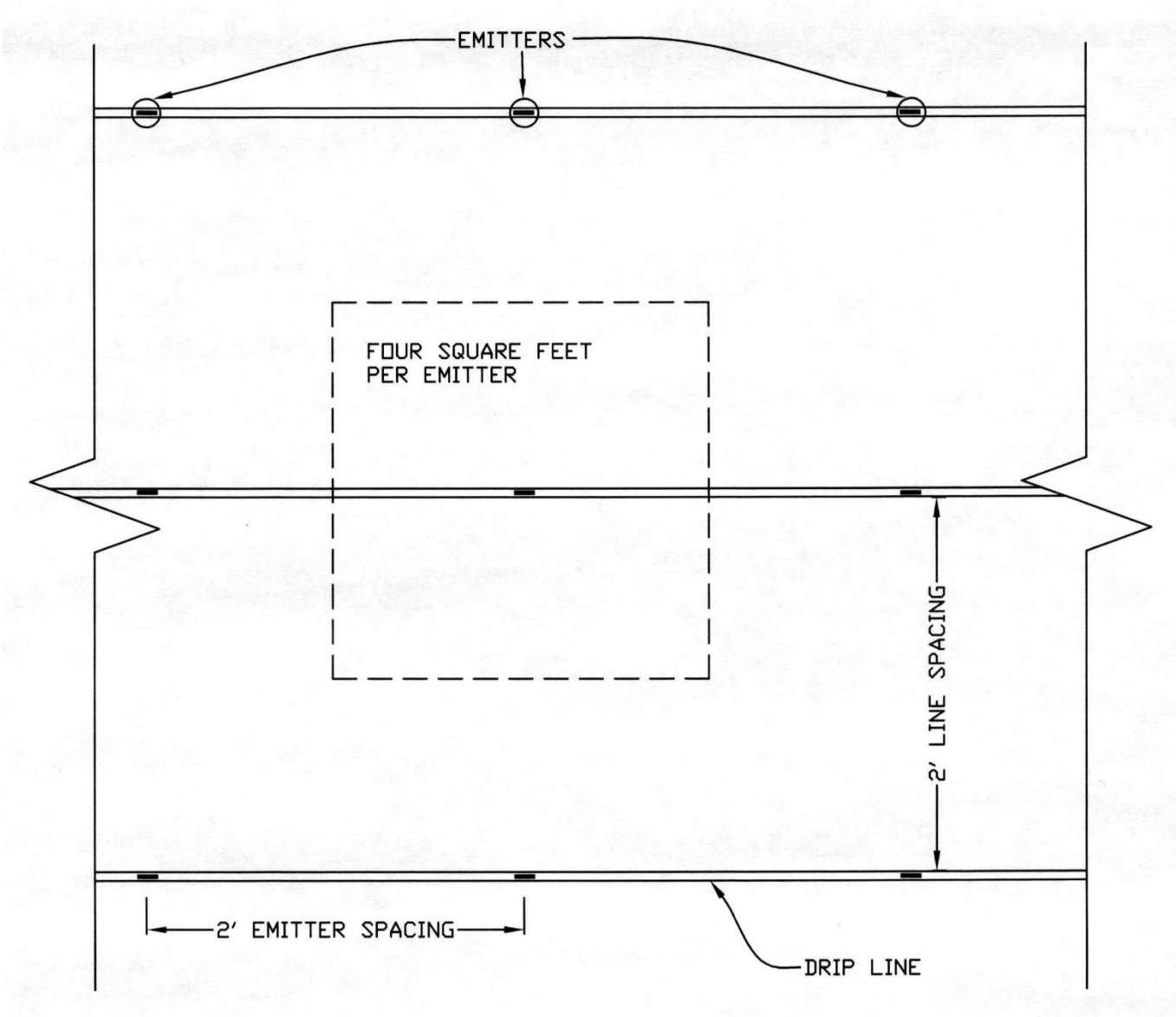
Why Drips are Different

- Micro Dosing is a Miracle in Poor Soils!

Micro Dosing

- With Drip Emitters & Dosing the Hydraulic Load is spread over lots of area at Slow rates.
- Lots of rest time between doses.



Micro Dosing

- Each Drip Emitter is responsible for four square feet.
- *Assuming 2 ft Spacing as in this example.

Drips Work

- Even Distribution over Time and Area.
- Up Too 24 Doses per day depending on given Hydraulic needs of flow from house.
- No Flow, No Dose.

Pump On

- Timer is set to run pump for 6 minutes on, 54 minutes off.
- Timer initiates Dose.
- Pump Kicks on and Send Effluent to Field for dispersion.
- As Effluent enters Field, Vacuum Breaker Closes helping Pressurize Field.

Pump On

- As Field Pressurizes, Emitters begin to drip effluent into soil at predetermined rate.
- Amount of emitters x emitter rate determine amount of Effluent introduced to field per dose. Emitters continue to dose for remainder of Cycle.
- Effluent that does not leave emitters for dispersal during dose returns to pump tank through return line.

Pump Off

- Timer Identifies end of Dose
- Pump Shuts off
- Vacuum Breaker falls open and air begins to enter Drip Line
- Effluent remaining in field returns to tank through return manifold and pressure manifold

Pump Off

- If multi zone switching valve is installed pressure from pump shutting off and backflushing causes the valve to switch to next zone for next dose

Drainback

The Field and all components in it must drain back into the pump tank when not actively dosing.

Crucial to prevent Freezing in cold temps due to shallow installation.

Best Installation Practices

- Never Install this system when the ground is wet. Soil Smearing will occur.
- Minimize & prevent soil disturbance during installation.
- Take extra care during layout phase to make sure lines are on contour.
- Ensure all components of field and tanks are watertight. Preventing Infiltration of Drip Systems is imperative to there long term Success.

Best Installation Practices

- Avoid pinching/kinking/or pulling on drip line during installation.
- Make Sure Vacuum Breakers are at highest point in the zone they serve.
- Flex Risers Should be tied onto Drip Line as high as possible.
- Fill low spots in field to prevent belly in drip line run.

Best Installation Practices

- EDUCATE the Homeowner.

- Have an O&M plan set up the minute the system goes live. Or it will Fail.

Don’t be scared of Oddball Drips

While they may present challenges, they are no different from the others in terms of installation difficulty

L Shaped Manifolds

Curved Fields to Maintain Contour

A Drips Just A Drip

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