

# Perc-Rite® Drip Dispersal Design Manual



**OAKSON, INC.**  
*Drip Dispersal & Water Reuse...Solutions For All Sites*

# **VERMONT**

# **PERC-RITE<sup>®</sup>**

# **DRIP DISPERSAL**

# **DESIGN GUIDE**

For systems using septic tank effluent or filtrate effluent with flows under  
6,500 GPD as allowed by EPR Chapter 1 and  
Perc-Rite<sup>®</sup> Drip Dispersal Approval issued June 23, 2014

This Design Guide contains:

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  - a. The Design Guide
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## 1. INTRODUCTION

The Perc-Rite® Drip Dispersal system is a non-invasive, flexible and environmentally sensitive means of wastewater dispersal. As the only drip dispersal brand approved for both septic tank and treated effluent in New England, Perc-Rite® interest and installations continue to increase every year.

Oakson is the New England distributor of the Perc-Rite® Drip Dispersal system: your source for assistance with design, installation and operation. Contact information, technical specifications and other valuable resources can be found on Oakson's website at [www.OaksonInc.com](http://www.OaksonInc.com).

We are proud to share that each Perc-Rite® Drip Dispersal system is assembled in the United States, contains a number of innovative and patented components, and each system is factory-tested before shipment to assure proper operation at start-up. Additionally, the components are covered by a manufacturer-provided one year product warranty.

### a. The Design Guide

This Design Guide will assist you in specifying a Perc-Rite® Drip Dispersal System. This technology has an approval letter issued by the Vermont Department of Environmental Conservation allowing use with septic tank effluent, and is allowed for use with filtrate effluent pursuant to Vermont's *Environmental Protection Rules (EPR)*, Section 1-923. These approvals are available on Oakson's website [www.OaksonInc.com](http://www.OaksonInc.com).

This Design Guide focuses on smaller systems typically seen on a residential scale such as a single family house or a small apartment unit. Since flows of under 1,000 GPD are most common, the information in this Design Guide is targeted to that type of project. Please consult directly with Oakson for design assistance with larger-sized Perc-Rite® Drip Dispersal System projects or aspects of your design which might not fit within this basic Design Guide.

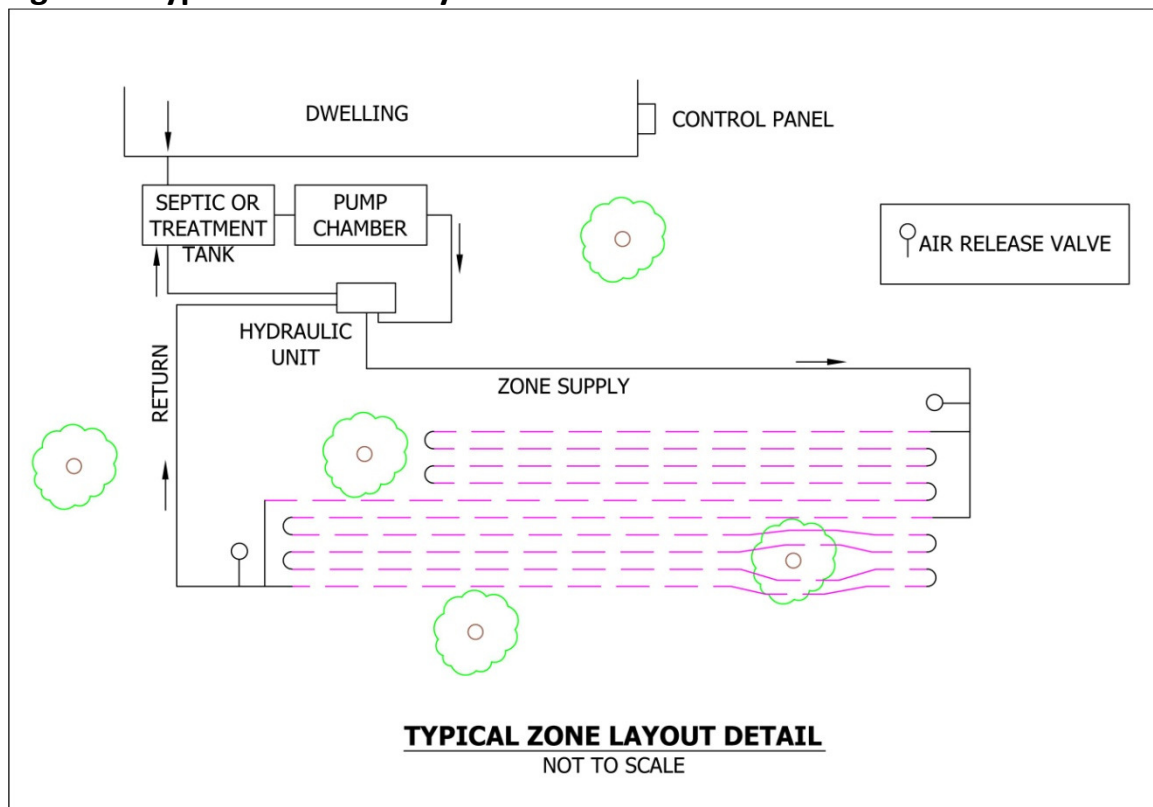
### b. The Perc-Rite® Drip Dispersal System Overview

Perc-Rite® Drip Dispersal is a pre-engineered, packaged system which

incorporates timer-based dosing of drip tubing with filtration to protect the drip tubing from clogging. The pump is capable of handling a range of distances and elevations and the emitters are evenly spaced along the tubing at 2-foot intervals. Small doses are applied into the soil throughout a 24-hour cycle to provide effective treatment, disposal and management of the effluent.

The general flow pattern is as follows: a pump sends the wastewater through a small filtering device, called the Hydraulic Unit, and then a force main conveys the effluent to the drip field. Within the drip field the effluent is supplied to one or more zones of tubing. Within a zone, the tubing is fed through a manifold system to assure uniform distribution.

**Figure 1: Typical One Zone System**



*The example shows all the typical components of a one zone system. This schematic has ten runs of tubing that are fed by two laterals coming off the single supply pipe. In addition to the major components described above, the image also shows air release valves (these are placed in an irrigation box below the ground surface at a point along the supply and return lines and allow for prompt draining of the manifold at the end of the pump cycle), a return line (used to automatically flush out the tubing to keep it in peak operating condition), and an electronic controller (to receive signals from the floats and determine when to turn on the pump).*

## 2. KEY SYSTEM COMPONENTS

- A key component of the Perc-Rite® Drip Dispersal System is the **Hydraulic Unit**. This device is used on all systems and serves two purposes: final filtering to protect the drip tubing and, for multi-zone systems, allowing feeding into the different zones. There are two models of Hydraulic Units – the ASD model which is designed to accommodate septic tank effluent, and the WD model which is designed to accommodate filtrate effluent.

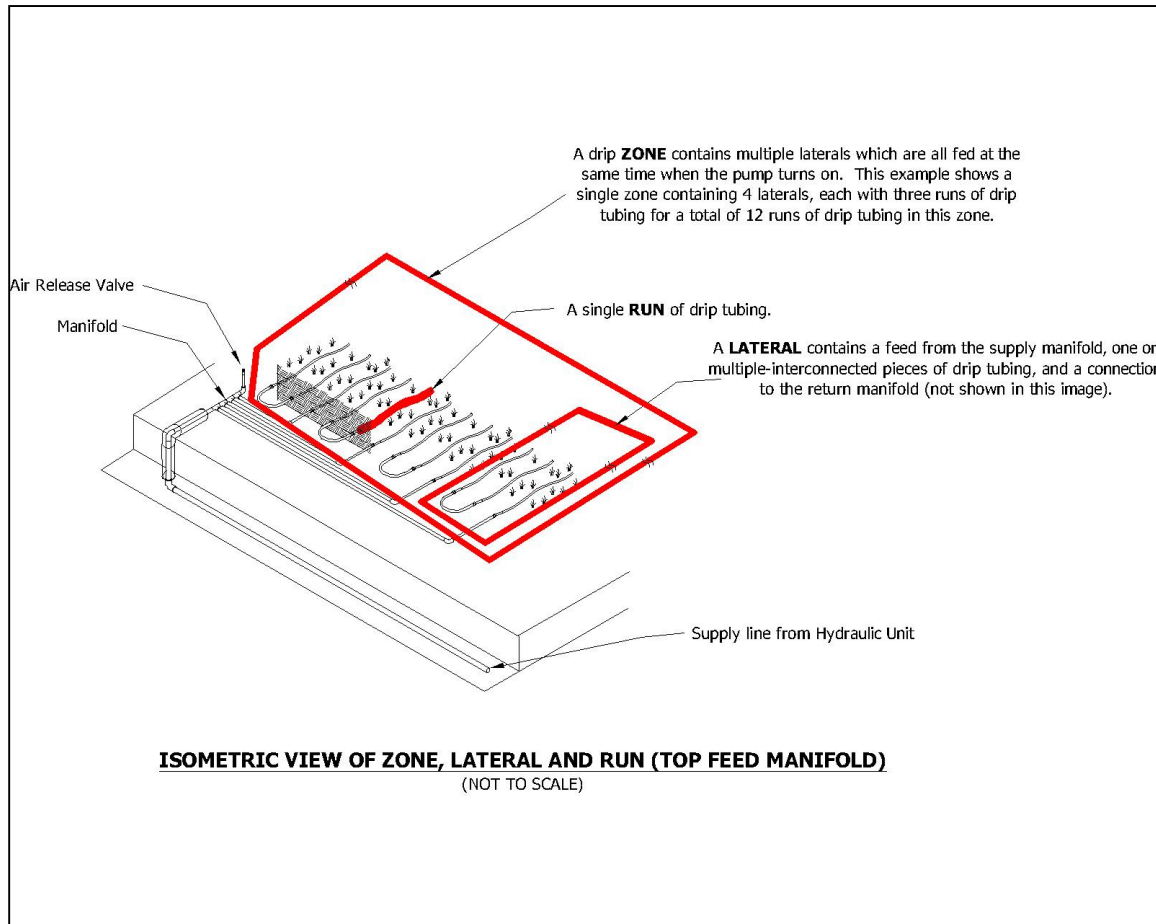
Within the ASD and WD Hydraulic Unit lines there are different models which can be used depending on the design flow for the project and the amount of drip tubing needed. The ASD-15 and WD-15 are used for flows up to about 2,000 GPD, the ASD-25 and WD-25 are usually used for flows between 2,000 to 6,000 GPD, and the ASD and WD models 40 through 250 are for flows larger than 6,000 GPD. Oakson offers assistance with selection of the proper Hydraulic Unit.

An added feature of all Hydraulic Units is the built-in totalizing and instantaneous flow meter. This diagnostic tool helps assure proper construction and long-term operation of the Perc-Rite® Drip Dispersal System.

- The **supply manifold** ensures even and instantaneous feeding of the drip tubing when the pump turns on. Effluent remaining in the manifold is drained into the soil upon shut-down.

The supply manifold divides the tubing into sections called **laterals**. A lateral will feed no more than 300' of tubing from the manifold. Once the manifold configuration is determined for the supply line, an identical manifold is made for the return line. A return line collects the effluent and brings it back to the Hydraulic Unit during periodic automatic flushing of the drip tubing.

**Figure 2: Drip Dispersal System Zone, Lateral and Run**



- The supplied **pump** sits inside a standard pump tank/wet well. The high head pump is very energy efficient in its operation and can overcome many distance and elevation challenges with ease. The pump feeds the water through the Hydraulic Unit into a supply line and then into the supply manifold. To assure rapid and even pressurization of the drip tubing two features are built into the system – air release valves and fully charged supply lines.

The air release valve sits inside a simple irrigation box that is flush with the ground surface. This device automatically provides for prompt pressurization of the drip tubing when the ball inside the valve closes, as well as providing for prompt draining of the drip tubing into the soil once the pump shuts off. The air release valve sits at the high point of the manifold system, and there is one provided

on the supply side manifold as well as one on the return side manifold. They are built on a gravel base and the provided irrigation box is insulated.

The supply line stays full for rapid pressurization and is built beneath the frost line. Vertical sections are insulated as they pass through the frost zone.

- Another key component is the drip dispersal **tubing** itself which uses specialized emitters to assure equal distribution throughout the drip field, regardless of elevation or distance from the dosing tank.

The tubing stays clean through an automatic flushing regime which scours any slime or material that might grow inside the drip tubing and brings it back to the septic tank for settling. Each time the pump is turned on the effluent goes through the drip tubing, the return manifold and the return line where it encounters a valve inside the Hydraulic Unit. This valve normally stays closed to allow instantaneous pressurization of the drip field, but about once a week it will be automatically opened in a pulsating manner to allow for flushing of the tubing to occur. The return stays full at all times and is built beneath the frost line, typically in the same trench as the supply line. Vertical sections are insulated as they pass through the frost zone.

- Lastly, a **control panel** with a simple timer-based logic programmer will turn the pump on and off depending on the volume of water in the tank, and will emit an audible and visual signal in the event of an operational problem.



### 3. DESIGN

#### a. General Design Principles

- Either septic tank effluent or filtrate effluent can be discharged into the Perc-Rite® Drip Dispersal system. A standard septic tank sized per Vermont code, or any approved filtrate system, can be selected for use prior to the Perc-Rite® Drip Dispersal system.
- Required vertical separations to groundwater, ledge and impervious soils are the same as needed for other types of wastewater dispersal systems. Reductions are similarly allowed when using filtrate effluent. Measurements to limitations are taken from the drip tubing.
- Drip dispersal tubing can be pulled into the existing ground surface or placed on a bed of sand and backfilled. This site-specific determination is based on the soil and groundwater conditions found at the proposed drip field site.
- The drip tubing can be placed following the land contours, rather than in a level bed configuration, more closely echoing the underlying water table usually found at a sloping site. This often results in a disposal system that fits more naturally with the original site topography.
- The Perc-Rite® Drip Dispersal system uses a control panel that has a timer which senses the water level in the pump tank and adjusts the dosing frequency to the drip field as might be needed to distribute the water into the soil over a 24 hour time period. For example, a typical single family house residence would have the pump turn on and feed the drip tubing with a measured dose volume every 3 hours over the course of a full day. If this was not sufficient to keep up with the water being introduced to the system, the floats would sense this and adjust the pump run frequency to be every 1.5-2 hours a day until it caught up with itself. This simple, programmable control panel is provided with every system and allows for great flexibility in managing short-term flow surges while still achieving the desired result of spreading the

wastewater load into the drip field in small doses throughout the course of the day.

- Individual runs of drip tubing are generally level with themselves, but each run may be placed at varying elevations from the tubing run above or below it. The manifold system will assure equal flow distribution throughout.
- While any shape field can be configured with drip tubing, as a general design practice it is recommended that the drip field and the drip tubing parallel the ground contours to the extent practical.
- Hardship waivers may be sought just like for any other type of disposal system.

#### b. Vermont-Specific Design Requirements

- Designs using filtrate effluent follow the procedures in Vermont's Wastewater System and Potable Water Supply Rules, with particular attention to Section 1-923. Designs using septic tank effluent follow the procedures in Vermont's Wastewater System and Potable Water Supply Rules except where they have been supplanted by the approval issued to use Perc-Rite Drip Dispersal. Relevant excerpts from the approval are provided throughout this Design Guide however the designer should obtain a copy of the approval from Oakson's website for reference.
- Any Vermont Class 1 or Class B Licensed Designer can complete the design for sites using septic tank effluent while only a Class 1 Licensed Designer can complete a design using filtrate effluent.
- The designer simply needs to calculate the area of the disposal field in accordance with the Vermont EPR and use that same footprint area for the drip dispersal field. For septic tank effluent systems, the absorption bed application rate is to be used. Linear loading rate calculations may be required as for any other type of disposal system in the EPR.

- Perc-Rite® Drip Dispersal is equivalent to pressure distribution wherever required in the EPR.
- For septic tank effluent systems, no site-specific hydrogeologic evaluation is required except as needed for in-ground systems greater than 2,000 GPD, for performance-based mounds, or for mound systems greater than 1,000 GPD.
- Setbacks to trees are reduced when using septic tank effluent to enable the drip dispersal tubing to be as close as 2' to vegetation if needed. Contact Oakson for assistance at locations where extensive trees are present as the footprint area of the drip dispersal field may need to be adjusted.
- No filter fabric is required above the drip tubing.
- No stone is needed beneath the tubing and there is only a 6" minimum bury which depth provides a significant reduction in finished height compared to more traditional disposal systems.
- A 150% sized primary area may be used in lieu of separate primary and replacement areas for new construction (as allowed pursuant to EPR Section 1-804). This could allow for a less expensive solution and/or less land usage for a wastewater disposal system when compared to using traditional disposal methods.

### c. Different Types of Disposal Systems in Vermont

When the tubing is below the ground surface it is considered an *absorption bed*, when the tubing is above the ground surface it is a *mound system*, and when using a treatment system it is a *filtrate system*.

When designing as an *absorption bed* pursuant to EPR Section 1-908, please note:

- The required area for drip fields and absorption beds are calculated by the same formula.
- Drip tubing bury depth is between 6" and 18" below the finished ground surface. The bury depth should be specified based on required water table and bedrock separations.
- Drip tubing is typically plowed into the soil to the design depth using as vibratory plow, or in very challenging sites, the tubing may be dug in by hand. No additional soil cover or topsoil is typically required. The designer may choose to raise the native surface grade by placing up to 12" of permeable soil over the system. The design bury depth of the drip tubing is measured from the finished surface grade
- No pressure testing of the drip tubing is necessary as the flow meter in the Hydraulic Unit will measure proper operating conditions.
- A drip field may be narrower than the 4' minimum in the EPR.

When designing as a *mound system* pursuant to EPR Section 1-913, please note:

- The required drip field area is simply calculated as an absorption bed within a mound.
- As a general design practice it is recommended that the drip field and the drip tubing be designed parallel to the ground contours to the extent practical. This allows each run of drip tubing to be generally level.
- Basal area calculations and, if necessary, hydrogeologic loading rates are calculated perpendicular to the contours of the ground not by the delineated drip field.

- The Perc-Rite® Drip Dispersal system is considered equivalent to mound disposal systems with regard to pressure distribution requirements.
- After the sand fill has been placed, construction of the drip field can occur in one of two ways: 1) place the tubing on the sand mound and backfill with 2" of sand and then cover material, or 2) backfill the mound with sand and soil and then pull the tubing into the finished grade using landscaping equipment. Smaller systems like those for single family houses tend to be built with the drip field on the open sand bed and then backfill placed over it. Larger systems tend to be built with the entire sand bed and cover material installed and vegetation established and then tubing is pulled in with a vibratory plow. Either construction method can be easily accommodated and does not change the design process.
- Like all mound systems, the installer needs to crown the entire mound wastewater disposal system with a cover of soil less permeable than the mound fill, with 12" of cover on the sides of the mound. Native soil from the site is normally suitable for cover material, though the top 2" to 4" of this cover must be topsoil. The entire mound must be seeded or sodded to assure stability of the installation. This grass cover is to be maintained and should be mowed on at least an annual basis.
- Requirements of EPR Section 1-913(e)(2-6) for pressure distribution systems are not applicable.
- No pressure testing of the drip tubing is necessary as a flow meter in the Hydraulic Unit can determine proper operating conditions.

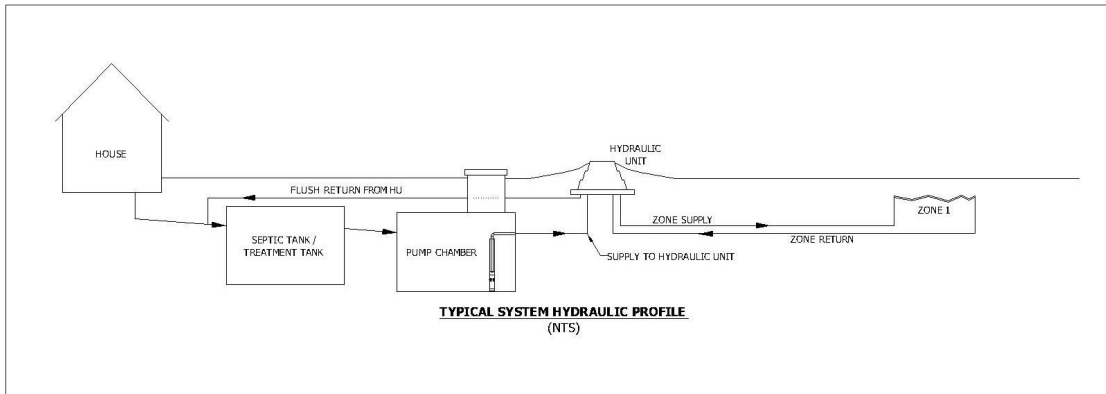
When designing a *filtrate disposal system* pursuant to EPR Section 1-916, please note:

- The required drip field area is simply calculated the same as for an absorption bed or a mound, then the appropriate credits and criteria allowed for filtrate disposal systems are applied.
- The Perc-Rite® Drip Dispersal system is considered equivalent to pressure distribution as required by EPR Section 1-916(a)(4).

Since no crushed stone is required and drip fields consequently are shallower systems, there are few instances when utilizing an at-grade

system with a Perc-Rite® Drip Dispersal system is beneficial. At-grade systems are therefore not outlined in this Design Guide. Please contact Oakson for assistance if you have a situation in which an at-grade system may be necessary.

**Figure 3: Typical System Hydraulic Profile**



## 4. PERC-RITE® DRIP DISPERSAL DESIGN PROCEDURES

### 1. Calculating the Drip Field Size

Use the loading rate in the EPR for the type of system being used – bed, mound or filtrate – and use the soil and flow to determine the square footage of area needed. For systems using septic tank effluent, the loading rate for absorption beds shall be used, and there is no minimum width requirement. In Vermont, the area needed for the drip dispersal field is calculated using existing formulas in the EPR as follows:

- For *absorption beds*, the drip field is sized in accordance with EPR Section 1-908. No excavation of the native soil is required, nor is a bed of crushed stone needed. The tubing is simply plowed through the existing soil to the required depth of at least 6” below grade.
- For *mound-type disposal fields*, the drip field is sized in accordance with EPR Section 1-913. The tubing is placed directly on the mound sand with an additional 2” of mound sand on top of the tubing, which is then covered by topsoil. A traditional stone absorption bed is not required and the resulting mound height is therefore typically at least 9” lower.
- For *filtrate effluent*, loading rates as indicated in EPR Section 1-916 are used to determine the size of the drip field.

After determining the minimum drip field size, square footage can be added as needed to work around large boulders or numerous trees if they exist in the disposal area.

## *2. Determine Tubing Length & Spacing*

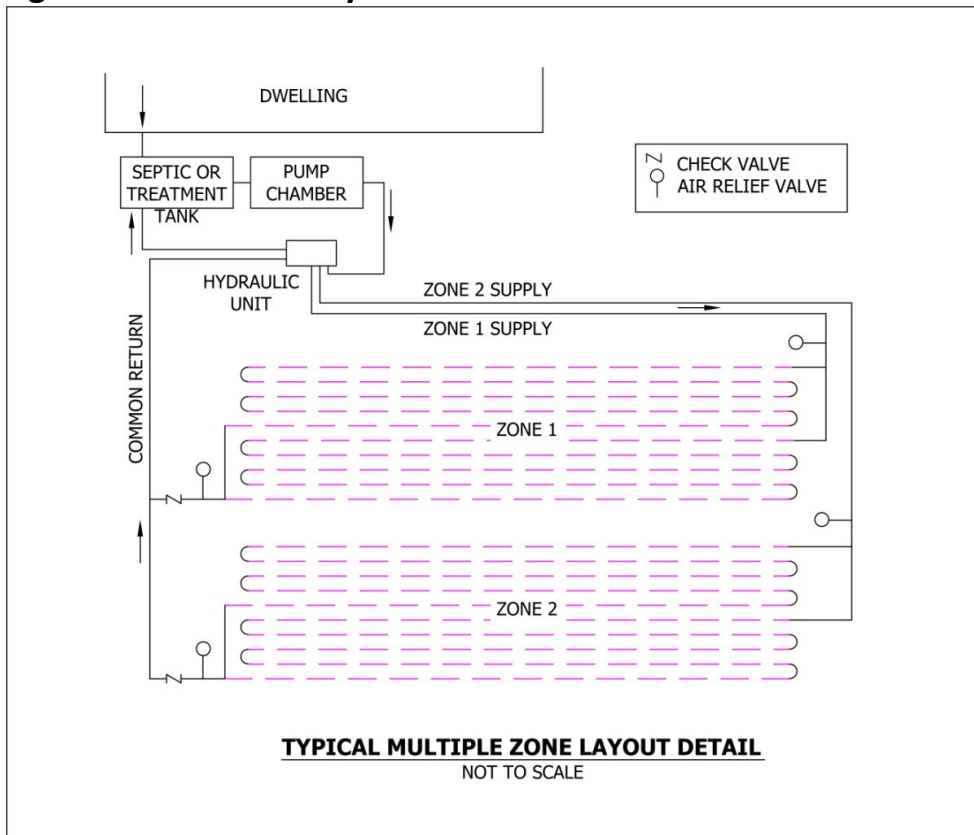
Once the footprint area of the drip field has been determined, and the length and width are calculated, simply use Oakson's website design tool to select the optimum tubing spacing within the drip field footprint area. Simply input the length and width of the drip field and Oakson's tool calculates the total tubing length and the spacing between the runs of tubing. In general, the minimum number of feet of drip tubing required is the drip field area divided by two.

In the event that the amount of tubing calculated exceeds the minimum required, tubing runs are simply placed closer together within the same required drip field area rather than expanding the drip field area. For example if there is a 100' long drip field and it is determined that a minimum of 550' of drip tubing is needed, the calculator will round that number of tubing to 600' so there are even lengths of tubing for effective disposal. Note that there is no cost increase for lengths of tubing required by the Perc-Rite® Drip Dispersal system beyond the regulated minimum length in those instances.

To provide the correct pressure and flow rate the tubing is divided into one or more **zones**. For example, a one-zone system will have all the tubing fed at the same time when the pump turns on while a two-zone system will alternate the feeding of zones. Most single family house projects use a one-zone configuration, while a small apartment building might have two-zones.



**Figure 4: A two-zone system**



### *3. Select Manifold Arrangement*

The designer needs to select the manifold position (same or opposite side of drip field) and the manifold designations for the drip field (the number of zones, laterals and runs of tubing). This can be output from Oakson's website design tool or calculated manually.

Drip dispersal systems with an even number of tubing runs will have the supply and return lines start and end on the same end of the drip field, allowing for both manifolds to be placed on the same side. Where there is an odd number of tubing runs the manifolds will be on opposite ends. Often, it is advantageous to add one extra tubing run so that the manifolds can be placed on the same side of the drip field.

Manifold systems are assembled at the site and for flat sites (slopes less than 3%) are slightly different than manifolds for sloping sites:

- On flat sites there is a force main located below the drip field with risers coming up to feed sections of drip tubing (laterals). This manifold configuration is called a **Side Feed manifold** which is similar to a manifold used for a pressure distribution system.
- On sloping sites a force main comes up at one point located above the highest point in the drip field and then has feeders which supply to the sections of drip tubing (laterals). This manifold configuration is called a **Top Feed manifold**. The photograph below shows a Top Feed manifold

If the manifold is determined in accordance with the procedures provided in this Design Guide and Oakson's website, the configuration of zones, laterals and tubing runs will, with certainty, provide the needed flushing velocity to keep the tubing clean. CAD details for both side feed and top feed manifolds for most common configurations are on the Engineering Support tab of Oakson's website. Use these, or assistance from Oakson, to select the proper manifold configuration and depict it on the design plan.

The same manifold configuration that is selected for the supply side of the drip field is applied to the return manifold.

Selecting the manifold is the part of the design most unique to using Perc-Rite Drip Dispersal. Please contact Oakson by phone or email for any needed assistance.

**Figure 5: One-zone, four-lateral, three-run system with a top feed supply manifold**



*At this site, which is sloping down from the bottom of the picture towards the top of the picture (the lowest run of drip tubing is farthest away), four interconnected sections of purple drip tubing fed through a top feed manifold, which consists of the air release valve and four sections of white PVC pipe. Manifolds are built at the site using standard PVC pipe and fittings based on the configuration selected by the designer.*

**4. If needed, repeat steps above for multi-zoned systems**

If the amount of drip tubing is more than 1,200 linear feet with a typical ASD-15 or WD-15 Hydraulic Unit, then a two zone system will be used to spread the wastewater out and ensure proper operation. Typically two equal-sized zones are used but drip dispersal affords great flexibility in this regard. If zones are different in size, simply repeat the steps above to determine the tubing amount, spacing and manifold needed for each zone.

### *5. Select and Place Hydraulic Unit*

The Hydraulic Unit supplied with the Perc-Rite® Drip Dispersal system provides for final filtering to protect the drip tubing.

You may wish to specify the location of the Hydraulic Unit on the design plan. If so, note that the unit sits in the ground within an irrigation box with an access cover that is flush to the ground surface. For the ASD-15 and WD-15 systems, the Hydraulic Unit is typically placed on top of the septic tank or pump chamber unless site grading is not suitable for the 18" high irrigation box, in which case the Hydraulic Unit can simply be placed to the side. Larger Hydraulic Units are often in an above ground irrigation box or inside the treatment plant building.

The Hydraulic Unit must be placed to allow for a gravity return line to flow to the septic tank inlet.

Filtrate effluent uses the WD series of Hydraulic Units while septic tank effluent uses the ASD series. Systems with flows up to about 2,000 GPD will use the ASD-15 or the WD-15 Hydraulic Unit. Contact Oakson for assistance selecting units for larger systems.

### *6. Note Piping Size*

You may wish to identify the pipes and their dimensions on the plan to provide for clarity during construction. The Hydraulic Unit and pump are plumbed for SCH 40 but suitable transition couplings can be used to allow SDR 26, HDPE or other allowable piping

The pipe from the pump to the Hydraulic Unit will be 1.5" diameter, as is the return pipe which flows from the Hydraulic Unit to the septic tank inlet.

The pipe (or pipes, if it is a multi-zone drip dispersal system) leaving the Hydraulic Unit to the drip field supply manifold will be 1" diameter, as is the return line (from the drip field return manifold to the Hydraulic Unit).

All other piping will be per EPR requirements.

### *7. Confirm Adequacy of Standard Pump*

The high-head pump that is provided with the Perc-Rite® Drip Dispersal system will suit most typical configurations and feed the drip tubing at the proper pressure. There is no need for the designer to perform head loss calculations as they have been already factored into the system.

For the ASD-15 and WD-15, the components are known to function as intended when the Hydraulic Unit is located within 30' horizontally and 10' vertically of the pump. This is often achieved by simply having the Hydraulic Unit placed on top of the septic tank or pump chamber.

When pumping uphill and the drip dispersal field is located within 100' of the Hydraulic Unit we know that almost any head differential can easily be met. Situations with greater distances or head are easy to custom design with assistance from Oakson. When pumping downhill, a simple pressure reducer is provided when needed to assure the tubing is not over-pressurized during operation.

The system components have been pre-engineered with the provided pump so detailed calculations or pump curves are not necessary.

### *8. Determine Float Settings*

There are four floats which will be located inside the pump chamber/wet well and the designer will need to specify the distances between them to assure proper operation of the timer-based dosing system. A description of the floats follows:

- The bottom '**Off float**' prevents pump burnout if the water level drops in the tank.
- The second one up, '**Timer Enable float**,' engages the timer to go into the normal operating mode.
- If triggered, the third one up, '**Peak Enable float**,' engages the timer to go into a more frequent pump operating mode to overcome surges of water.
- The highest float, the '**Alarm float**,' signals an audible and visual alarm on the control panel in the event of a malfunction.

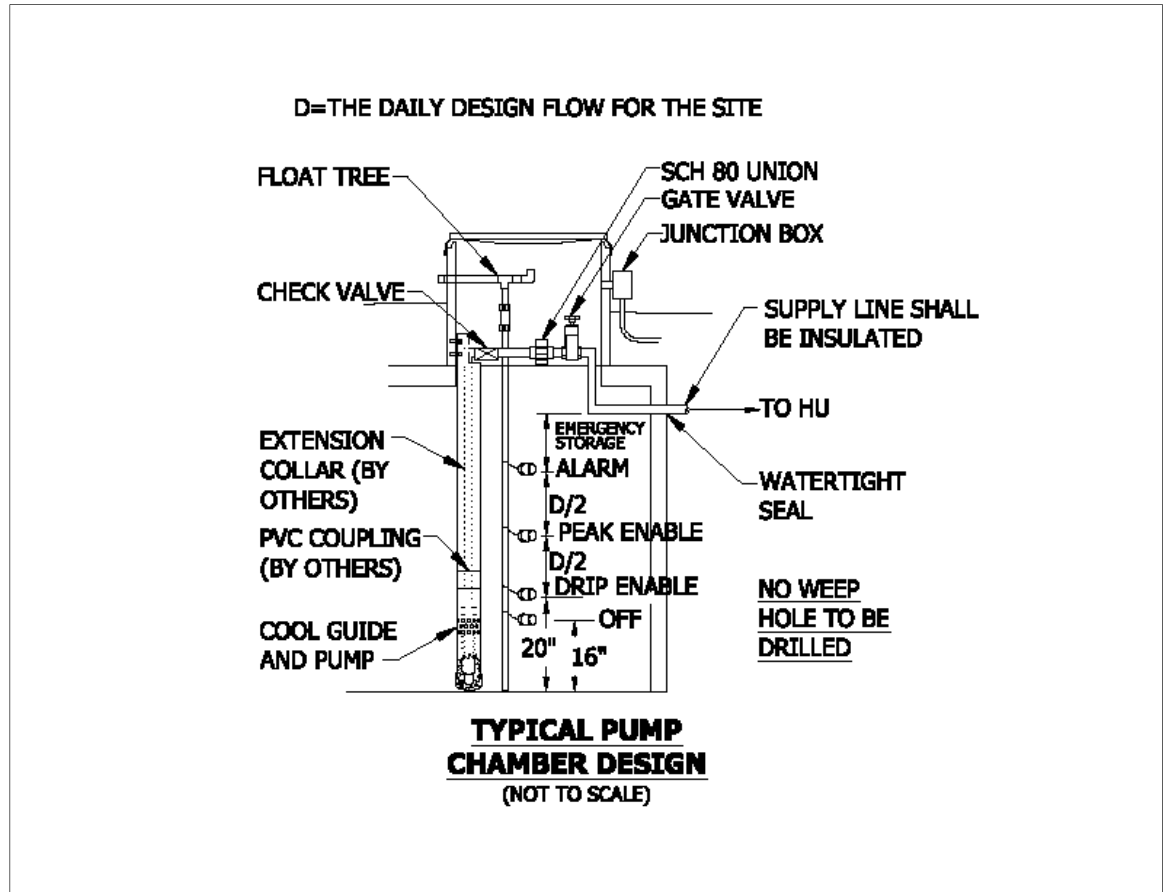
The lowest two floats are factory set at 16" and 20" off the tank bottom. For the position of the other floats, first determine the height of the alarm float. To set the alarm float height, simply calculate one day's worth of design flow in inches, add 20", and set the alarm float at that height. Once the height of the alarm float is established, the third float (the peak enable float) is then simply set at half the distance between the drip enable float and the alarm float.

For example, a single family three bedroom house would have a design flow of 420 GPD. If the pump tank were 1,500 gallons capacity in size we might have 30.4 gallons per inch of storage capacity in the tank, so a full day's flow might be  $420/30.4 = 14"$ . Knowing the timer enable float is at 20" off the tank bottom, we would set the alarm float at  $20" + 14" = 34"$  off the tank bottom, and the peak enable float at half that distance  $20" + 7" = 27"$  off the tank bottom. Of course the design flow and the dimensions of the pump tank/wet well will determine the float settings so they need to be calculated specific to each site.

Capacity in the pump tank is needed for the required emergency storage above the alarm float. The exception is when an approved pump or filtrate system is provided which contains flow equalization and emergency storage.

Dual alternating pumps can easily be configured when required.

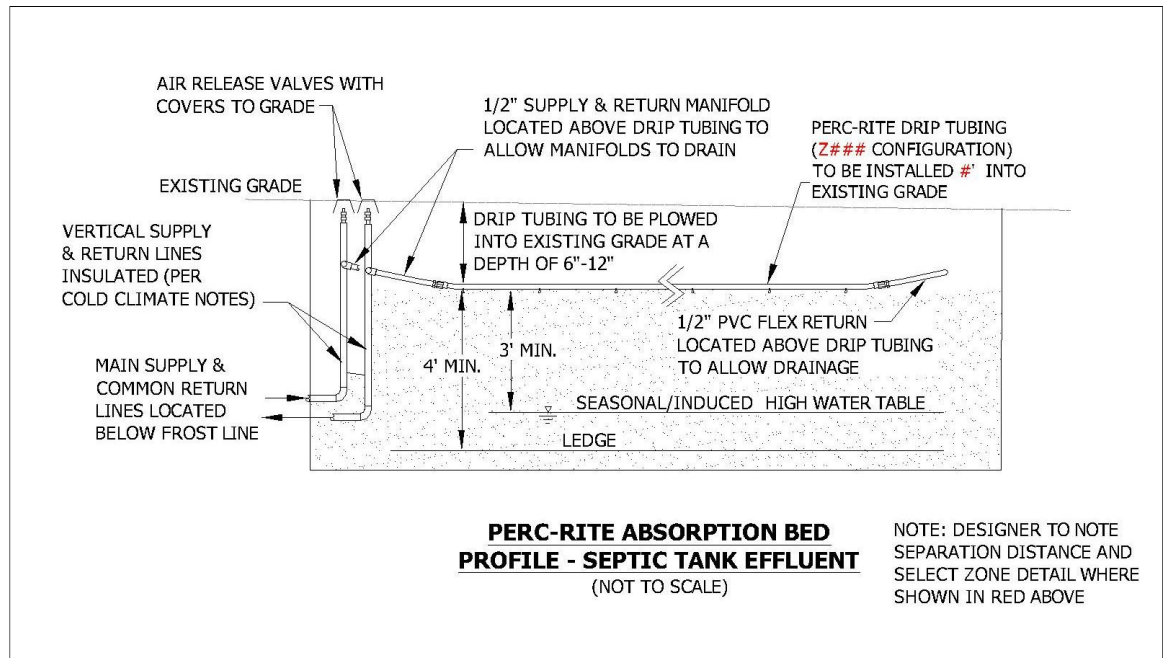
**Figure 6: Pump tank float positions**



### 9. Depict Method of Tubing Installation

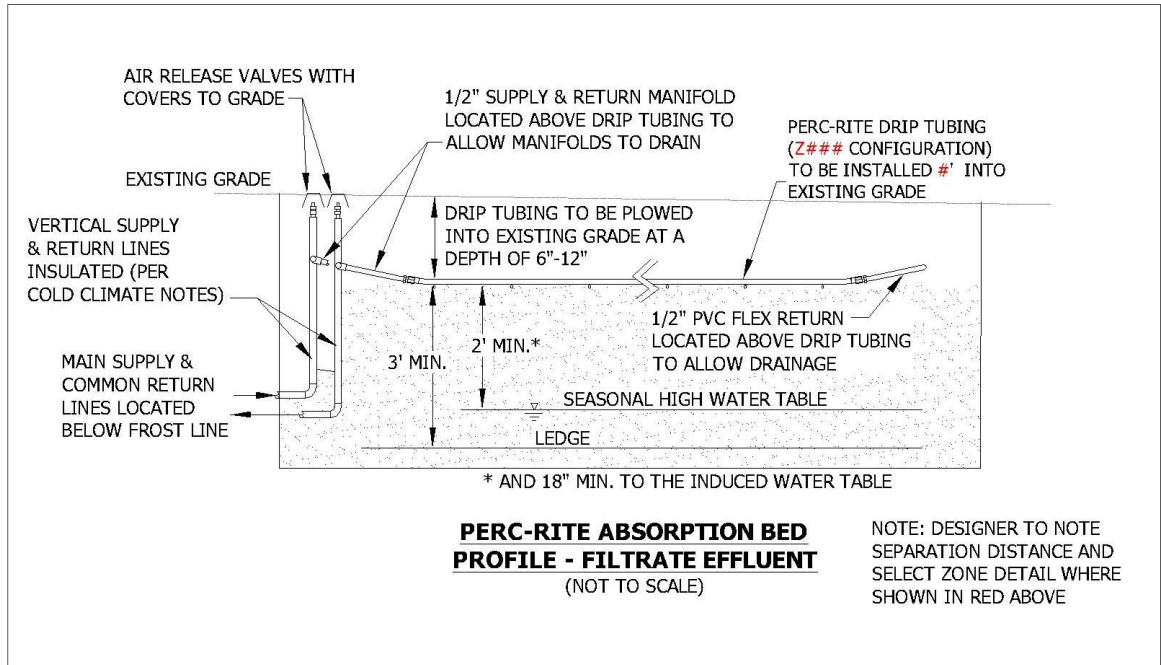
Depending on the soil conditions and the water table at the site, the tubing will either be plowed into the existing ground or placed on or in a bed of sand fill. Like all sand fill, if needed it is to meet the specifications of EPR Section 1-913(c). Perc-Rite® Drip Dispersal requires only 6” bury depth in a bed and 12” in a mound. Typical profiles showing a plowed in or a sand bed tubing placement are provided on Oakson’s website and are recommended to be put on the design plan.

**Figure 7: Profile of Perc-Rite Drip Dispersal in Bed Configuration Using Septic Tank Effluent**

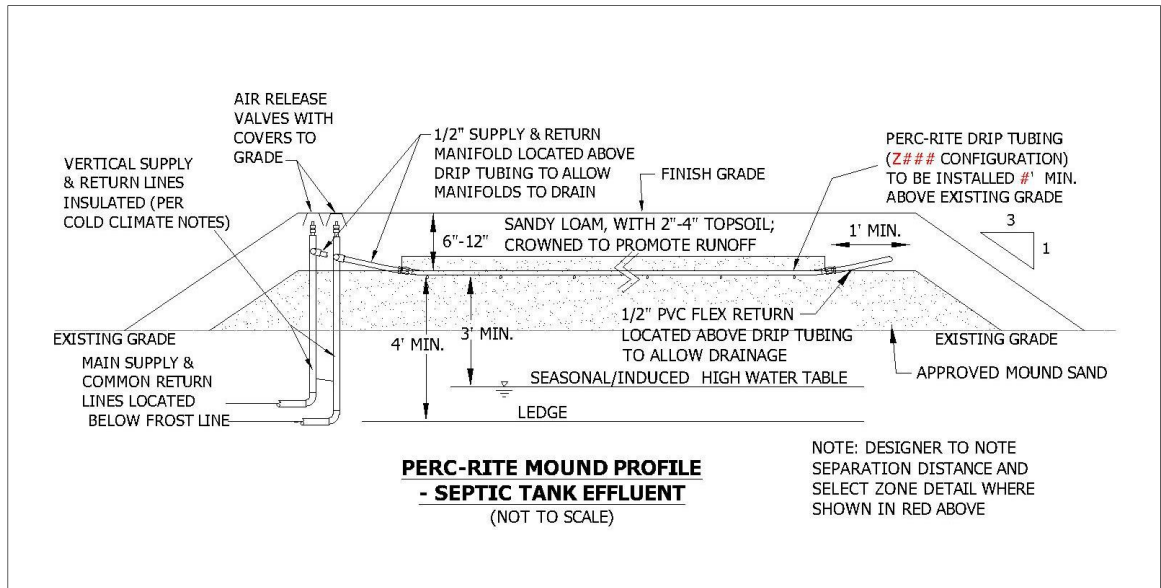




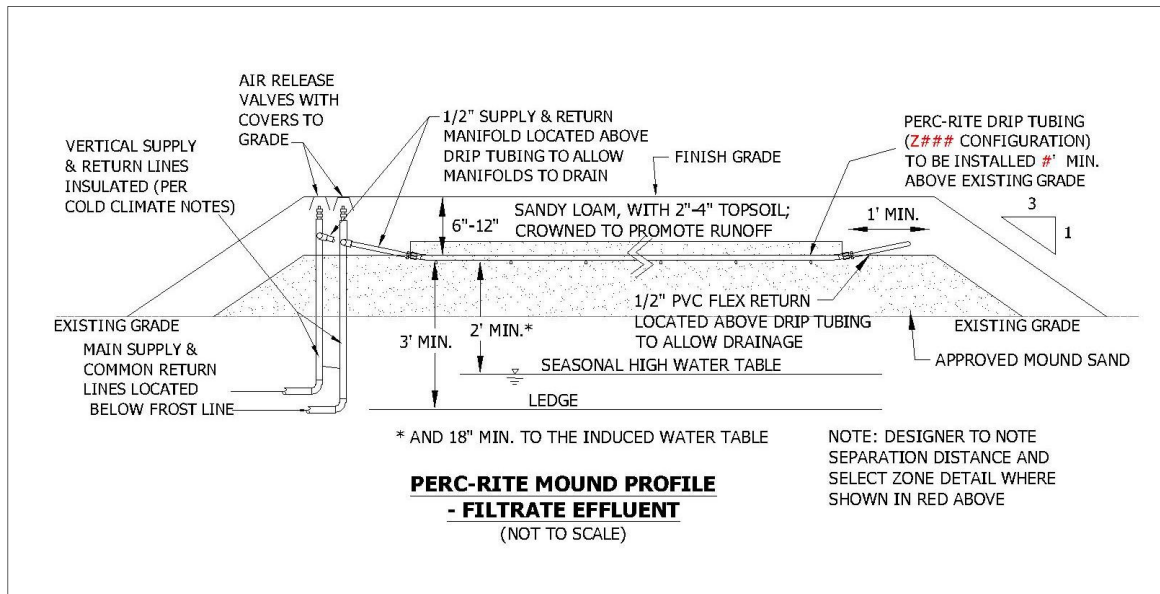
**Figure 8: Profile of Perc-Rite Drip Dispersal in Bed Configuration Using Filtrate Effluent**



**Figure 9: Profile of Perc-Rite Drip Dispersal in Mound Configuration Using Septic Tank Effluent**



**Figure 10: Profile of Perc-Rite Drip Dispersal in Mound Configuration Using Filtrate Effluent**



### 10. Depict Final Grading

If changes to the site are needed due to a mound system, depict proposed grading as might be needed. If the drip field is built on a sand bed, it is typical to have the sand fill follow the existing contours (as the water table typically does the same) which will help reduce the needed volume of sand and the associated visual impact.

### 11. General Information to Consider

#### Oakson Design Review

Working with the designer to provide feedback on plans prior to submission is something that Oakson welcomes. Moreover, when requested, Oakson will provide a letter of concurrence with the design plan which can be used for submission to regulatory agencies as might be needed.

#### Soils

Acceptable soil conditions to place the drip dispersal system can include the topsoil horizon as long as it is naturally occurring and pervious. If the designer desires to retain the topsoil layer it must be correctly classified during the soil evaluation. Percolation tests must also be performed in accordance with the EPR.

Designing a standard drip field underneath a parking area is generally not acceptable because the pavement or compacted soil above will usually prevent adequate oxygen transfer to the drip field. Contact Oakson for special design assistance if such a configuration is necessary.

### **Cold Weather Design**

Basic aspects of typical cold weather installation procedures include a temperature-sensitive heater strip located inside the Hydraulic Unit enclosure, locating the supply line below frost, placing insulation on feeder pipes where they traverse the frost zone, and drainage of the manifold pipes into the drip tubing and allowing the drip tubing to empty into the soil after each pump cycle.

All installations in New England are designed and built with Perc-Rite® Drip Dispersal's cold weather procedures. Information with details and notes about these procedures is part of the standard detail sheet available on Oakson's website and should be included on the design plan.

### **Seasonal Facilities**

For facilities with only seasonal or intermittent occupancy, the basic design remains the same. If it is anticipated that power will be turned off at the facility then the Hydraulic Unit will be constructed with couplings to allow easy removal and drainage for the winter and re-installation in the spring. If power is retained to the facility then the system can simply be left in place with no special modifications required. For larger flow changes such as summer campgrounds with a year-round caretaker, all but one zone can be turned off for winter usage.

### **Construction**

Like prudent construction practice for any type of disposal area, equipment not needed to build the drip field should be kept off the disposal area to prevent undesirable compaction of the soil. Installation of the drip tubing is not to be initiated when the soil moisture content is high. To test, see if a fragment of soil from about 9" below the surface can easily be rolled into a wire. If so, the soil moisture content is likely too high for construction to occur.

### **Construction Inspection**

Upon completion of construction of the drip field, flow rates are measured via the flow meter in the Hydraulic Unit and compared to the intended flow rate based on the number of orifices in the drip field. Therefore, no pressure testing is needed within the drip field to confirm proper construction.

The force main piping may either be left exposed and visually observed to be watertight by operating the system during its clear water start-up, or may be backfilled and pressure tested as would be done for any other pump system.

A licensed designer must inspect the system during critical stages of construction, and may be required to prepare a written certification stating the construction has been completed in accordance with the project plans.

### **System Maintenance and Reporting**

Like all non-traditional systems allowed in Vermont, there are requirements for annual routine preventative maintenance by trained personnel. Contact Oakson for information on certified service providers in your area.

## 5. CONCLUSION

This Guide is intended to assist in the design process for a Perc-Rite® Drip Dispersal System. If you require additional assistance or just want someone to walk you through each step, an Oakson staff member will gladly help at no additional cost.

Oakson is committed to your project success. We want to review design plans before they are submitted, assist with laying out a drip field, provide CAD details, or otherwise assist designers, contractors, owners and regulators in Vermont achieve successful installations of Perc-Rite® Drip Dispersal Systems.

**1-877-OAKSON1**

Or

**info@oaksoninc.com**

Oakson, Inc. is an authorized user of the Perc-Rite® trade name and related materials for drip dispersal systems. Perc-Rite® is a registered trade name of American Manufacturing Company, Inc., Elkwood, VA

## **Perc-Rite® Drip Dispersal Designer Checklist**

- Drip field area calculated per EPR and shown
- Manifold system selected and detail provided
- Tubing spacing calculated and shown
- Hydraulic Unit model selected and location shown
- Return line from Hydraulic Unit to septic tank inlet shown
- Pipe sizes labeled
- Float height and emergency storage calculations completed and shown on plan
- In-ground or above-ground detail provided, fill and cover specifications provided
- If desired, system flow profile, construction notes and other standard details from Oakson website added to plan
- Operation and maintenance documents prepared (by authorized O&M service provider)