

# Synthetic Liner Protection



Lost Valley Hatchery - Warsaw, MO



**M**ulti-Flow Synthetic Liner Protection by Varicore Technologies is an innovative and cost effective system designed to protect synthetic liners from damage caused by methane gas and water accumulation. It can also serve as a leak detection vent system (LDVS) for the liner. Providing gas venting, drainage, and leak detection in one system is effective and cost efficient. The Pond Protection System utilizes components from the proven Multi-Flow Drainage System. The documented strength, capacity, and longevity of this system make it a logical choice for many different liner applications.

**MULTI-FLOW**

# Multi-Flow Synthetic Liner Protection

## Venting Design

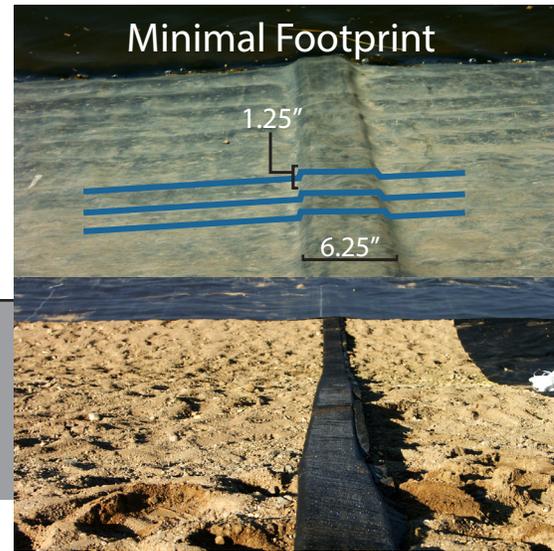
Multi-Flow is installed under the liner to provide a flow path for gases and liquids preventing damage caused by lifting or tearing of the liner. The top end of the system is vented to the atmosphere or collected in a manifold. If desired, positive venting (blower units) can also be added to outlets to aid diurnal atmospheric pressure changes in removing gases.

*Multi-Flow lines can be rolled out over the prepared surface and covered by the pond liner. This method avoids the need for trenching and it locates the Multi-Flow right where methane and other gases are most likely to accumulate. Installers can create a depression if a completely smooth liner is desired.*

The Vent Stack is commonly used to vent collected gases to the atmosphere, while protecting the system from the elements. They are typically placed around the perimeter of the liner and are connected at the highest point of the collector lines. It is compatible with PVC/Sch 40.



East Dublin Dairy - DeGraff, MN



## Ease of Use

Multi-Flow is easily rolled out in a grid pattern on the prepared and graded base. All intersections of the Multi-Flow are joined together with factory provided connectors. These connectors assure a restriction-free coupling between the various lines in the grid. Typical spacing for these grid lines is 10' to 20', though they may be may changed to meet special circumstances. Varicore does not recommend exceeding this spacing due to the increased potential for gas bubble accumulation.

## Affordable

Multi-Flow Synthetic Liner Protection is very affordable with typical cost being less than 2% of the project, depending on spacing and options selected. Installation time and labor are very minimal. Placing the Multi-Flow and attaching the "snap-on" connectors is a one-man operation. With savings of 75% of a typical french drain system.

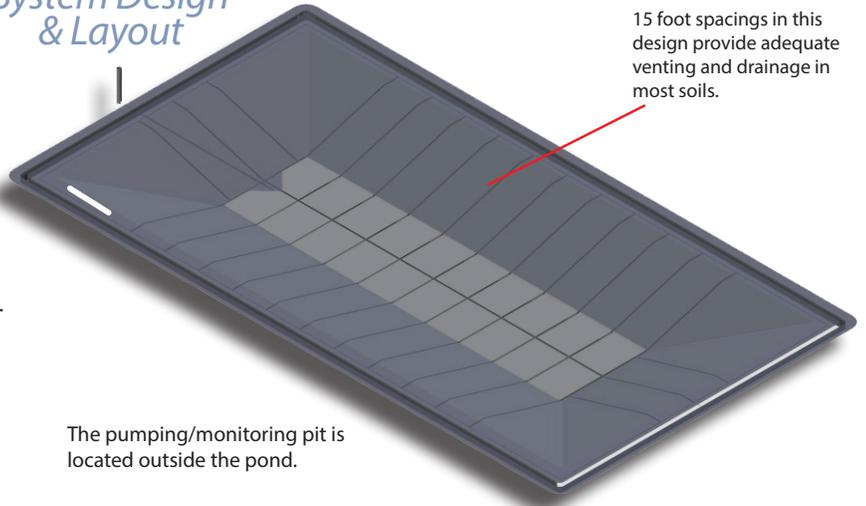


# Multi-Flow Synthetic Liner Protection

## Drainage Design

The low point of the Multi-Flow system is typically connected to piping which leads to a pumping or monitoring pit, or discharge location. This pit, located outside of the containment area allows ground water to be removed from under the liner with a variety of pumping/piping options. Most importantly, it offers a leak detection/inspection point as well.

## System Design & Layout

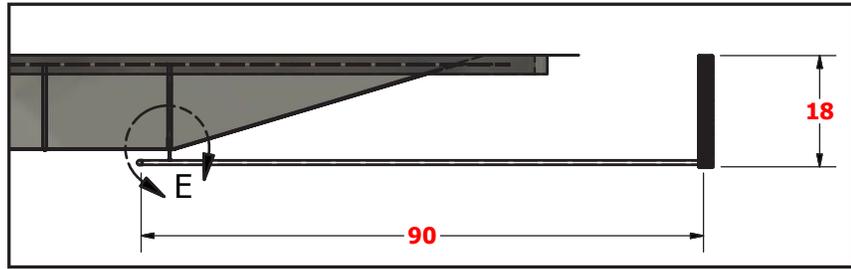


DNR Hatchery - Warsaw, MO

The pumping/monitoring pit is located outside the pond.



Side-view of pond, embankment and drain outlet is provided below.



## Eliminate Whale Backs



Liner whale backs can result from accumulated invading groundwater, gas bubbles, or a combination of the two. This can occur when there is no venting or drainage installed below the liner.

## Additional Capabilities



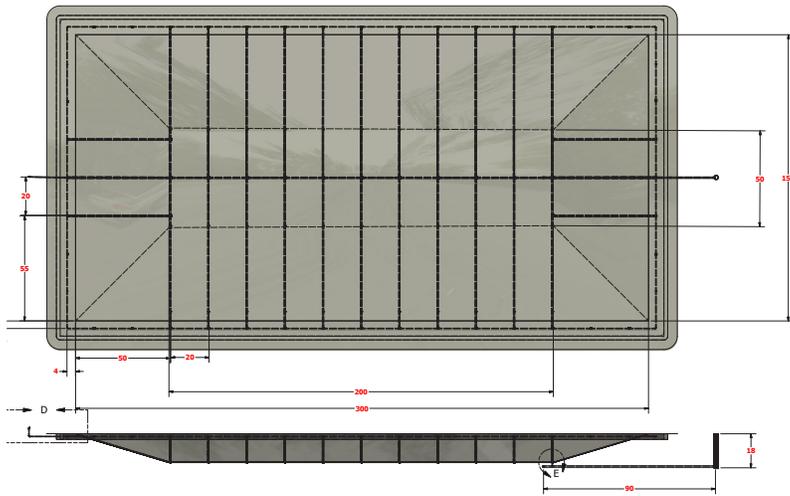
Methane gases can be collected by Multi-Flow, filtered and then be recycled into a renewable energy.



# Multi-Flow Synthetic Liner Protection

## System Layout & Design

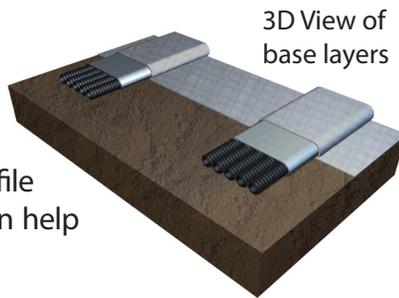
We know each and every project is unique and important in its own right. We working with engineers, contractors, and owners, developing tools that will help them cost-effectively drain and vent their liner applications. Multi-Flow can be configured into virtually every application, including Ponds, Lagoons, Wastewater, Tailings, Containment, Industrial Waste, etc.



Description	Method	Value
<b>FLOW CORE</b>		
Thickness, inches	ASTM D-1777	1.0
Flow Rate, gpm/ft*	ASTM D-4716	29
Compressive Strength, psf (modified sand method)	ASTM D-1621	6000
Perforations / sq. ft.		>300
<b>TEXTILE</b>		
Weight (oz/sq2)	ASTM D-3776	4
Tensile Strength, lb.	ASTM D-4632	100
Elongation %	ASTM D-4632	50
Puncture, lb	ASTM D-4833	50
Mullen Burst, psi	ASTM D-3786	200
Trapezoidal Tear, lb.	ASTM D-4533	42
Coefficient of Perm, cm/se	ASTM D-4491	0.1
Flow Rate, gpm/ft2	ASTM D-4491	100
Permittivity, 1/sec	ASTM D-4491	1.8
Apparent Opening Size	ASTM D-4751	70
UV Stability, 500 hrs, %	ASTM D-4355	70
Seam Strength, lb/ft	ASTM D-4595	100
Fungus	ASTM G-21	None

## Additional Services

We are happy to work with you, providing consulting, layouts/designs, construction details and documents, in a variety of file types. Let us know how we can help your project!



\* Horizontal Test, gradient = .01, pressure = 10psi for 100 hours

- Values given represent average roll values



Iowa Select Farms - Iowa Falls, IA



Holte-Krause Landfill - Wassau, WI

Pond | Leachate Tailings | Lagoon | Waste Water Treatment | Mining

*Varicore technologies provides design assistance to meet the needs of individual of specific ponds or lagoons. Proper planning saves money, speeds up installation, and dramatically extends the life of a liner.*

