

**Carroll County Liner Inspection Chart for Stormwater Management Facilities**

Stage	Certifying Engineers Approval					
	Facility #1 <sup>2</sup>		Facility #2 <sup>2</sup>		Facility #3 <sup>2</sup>	
	Initials <sup>1</sup>	Date	Initials <sup>1</sup>	Date	Initials <sup>1</sup>	Date
A. Liner Material: Use polyvinyl chloride (PVC) or approved equal (30mil minimum thickness).						
B. Cushion: Place a cushion layer above and below the liner if required. The cushion may be an 10-ounce per square yard or heavier nonwoven geotextile. If subgrade or cover soil contains any sharp angular stones or particles greater than 3/8 in. or any other objects that could damage the liner, cushion layers above and below are required.						
C. Subgrade Preparation: Prepare the subgrade to conform to manufacturer's recommendations. The subgrade materials must be free from sharp, angular stones, and the surface free from oversized particles, or any objects that could damage the liner. The subgrade surface must provide a smooth, flat, and unyielding foundation for the liner.						
D. Compact/ prepare the bottom surface with a vibratory plate or a smooth drum roller.						
E. No standing water, mud, vegetation, snow, frozen subgrade, or excessive moisture may be present at the time of placement.						
F. If groundwater or angular particles are present at subgrade, 6 inches of #57 stone is required below the liner cushion compacted with a vibratory plate or smooth drum roller.						
G. Installation: Ensure liner is installed in a relaxed state, free of tension and stress in any direction. No bridging or trampolining of the geomembrane is allowed.						
H. Liner Protection: Protect liners from mechanical damage by placing the liner from the bottom of the slope to the top of the lined slope. One foot of earth is required on top of the liner prior to tracking by any heavy machinery.						
I. Anchorage: Anchor the liner to prevent uplift due to wind or slippage down the side slope in accordance with manufacturer's recommendations.						
J. Penetrations: Install penetrations through the liner in accordance with manufacturer's recommendations. Penetrations must be watertight (see details on this sheet).						
K. Cover Soil: Cover geomembrane liners with a minimum of 12 inches of soil measured perpendicular to the finished surface. Do not use cover soil that contains sharp, angular stones, oversized particles, or any object that could damage the liner. Place cover soil within 24 hours after placement of the liner to minimize the potential for damage and slippage.						

## Notes To Be Placed Below Inspection Chart

Engineer's Name: (Design Engineer's<sup>3</sup> Name per §151.095)

Phone Number: (Design Engineer's<sup>3</sup> Phone Number)

Please notify certifying engineer 48 hours prior to commencing liner placement.

Notes:

1. Inspection signoff by personnel working for certifying professional engineer.
2. Name Lined Facilities to correspond to the plans.
3. The design engineer must be the certifying professional unless this is a non-MD-378 facility. In that case, design, inspection, and certification can be performed by a professional land surveyor.

Martin B. Covington III, P.E.

Carroll County Stormwater Management Program Engineer

Distributed for Comment at Carroll County Surveyor's Meeting

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## Alternate Field Seaming Methods

### 1. Thermal Fusion Field Seaming (Continuous Width)

The two most common seaming methods are Hot Wedge and Hot Air. Either method is capable of producing a quality seam. These units are equipped with speed and temperature controls with digital (LED) readout along with pressure adjustment.

- Hand Held Leister or equal can be used for pipe boots, details, and patching.
- Each method must be capable of producing sufficient amount of controlled heat and pressure applied to the seam overlap contact zone, resulting in a continuous thermal weld.
- Pressure squeeze out along seam edge to be kept to a minimum in order to maximize overall seam thickness.
- Exercise caution when operating welder in direct contact with subgrade. Drive (pressure) rollers must be kept clean at all times.

### 2. Chemical Fusion Field Seaming (PVC Geomembranes ONLY)

Chemical fusion agent shall be applied between the two surfaces to be joined. These surfaces shall be mated together, and pressure applied to the upper surface by means of a roller (high durometer rubber, nylon, or steel).

A sufficient amount of chemical fusion agent shall be applied between the two geomembrane surfaces to be joined so when rolled, a thin excess of agent will be forced out of the seam. Any excess chemical agent shall be wiped from the geomembrane. The lower of the two surfaces to be joined shall be completely wet by the chemical fusion agent.

If any discontinuities are noted, allow approximately ½ hour before reapplying agent. This process can be expedited by using artificial heat.

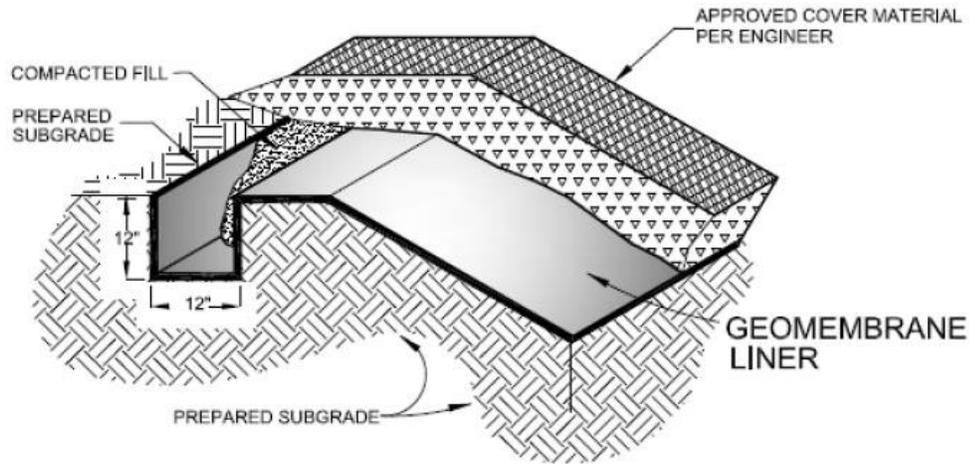
### Underliner Drainage \*

Liners require a drainage system if the invert elevation of the pond is within 2 feet of the seasonal high-water table. Hydrostatic pressures from fluctuating groundwater levels or leakage through the liner may cause the liner to float. Incorporate a drainage system when conditions exist that may result in floating of the geomembrane liner.

\*Note to Engineer: Do not place the Underliner Drainage section on the plans. It is your responsibility to design based on site specific geotechnical testing.

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Note

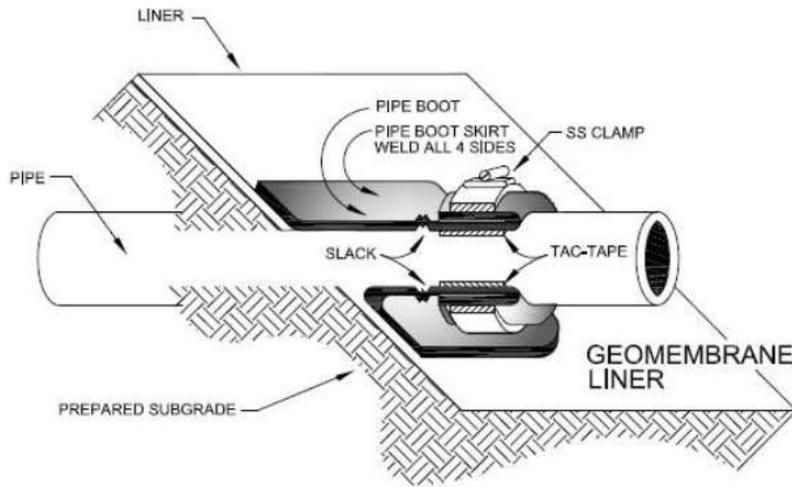


ANCHOR TRENCH DETAIL

NO SCALE

These are conceptual details. Specific details for the project (with dimensions) must be included on the plans.

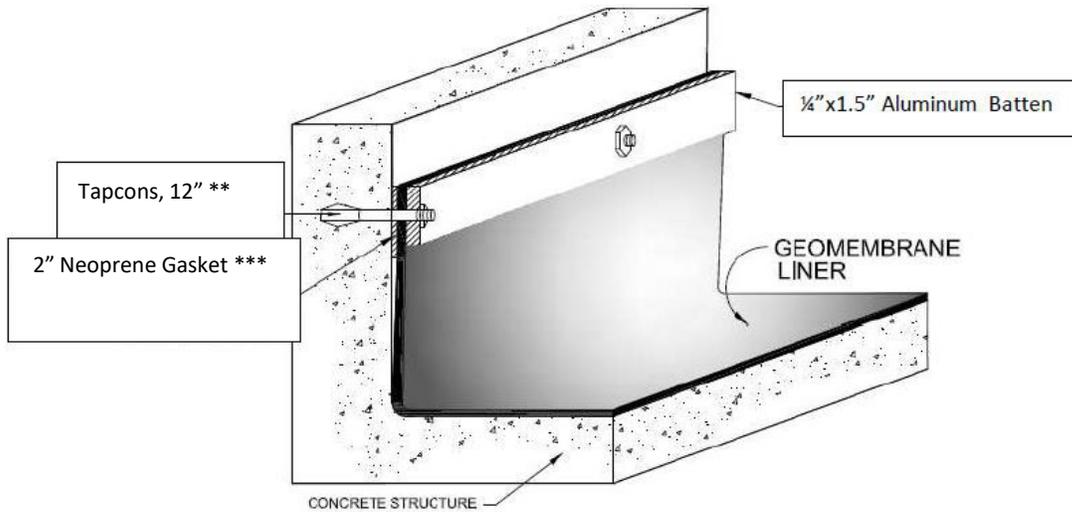
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PIPE BOOT DETAIL\*

NO SCALE

\*Must be a manufactured (not field fabricated) pipe boot. Follow manufacturer's pipe boot installation procedure.



VERTICAL CONCRETE ALUMINUM BATTEN DETAIL

NO SCALE

\*\* Any fastener with equivalent performance characteristics is acceptable

\*\*\* May substitute 2" Butyl Caulk. If substituted, must be continuous (no gaps), and be a separate inspection item

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