

# GN1-21 DESIGN AND ENGINEERING MANUAL

## Envirolok Bags

### Filled unit size:

26"L x 15"W x 5.5"H

66cm L x 38cm W x 14cm H

### Calculated unit fill:

1.25 cu ft

0.0354 m<sup>3</sup>/unit

**Note:** Unit size may vary based on actual fill



- **Face Area: 1 SF\***
- **Mattress Face Area 2.7 SF\***
- **+1.25 cf/ bag \***
- **80-90 lbs. Carrying Weight\***

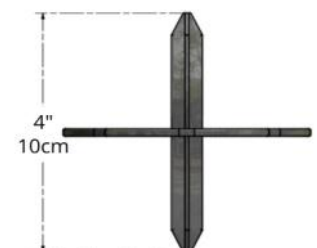
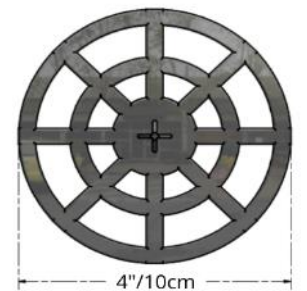
The following notes are provided as a general overview for design and engineering. Refer to complete product specifications, design software and training videos available at [www.envirolok.com](http://www.envirolok.com) or [www.caddetails.com](http://www.caddetails.com). Please contact our engineering / technical team at 608.226.2565 or [ecosolutions@envirolok.com](mailto:ecosolutions@envirolok.com) with any questions or design assistance.

## Envirolok Unit

- One (1) Envirolok bag
- Two (2) Connector Pins (Spikes)
- One (1) UV Resistant Tie

## Envirolok Spikes

- 2 spikes shall be installed for each bag.
- Spikes shall be a minimum of 4" from all edges of the bag.
- Spikes should be placed in base course material or foundation soil prior to installing the foundation course if possible.
- Do not place spikes in the top of the coping unit.



## Envirolok Bag-Fill

**Bag-fill volume:** 1.25 cf (.3054 m<sup>3</sup>)

**Bag weight:** 80-90 lbs (36 kg- 41 kg)

**Bag-fill content:**

**60-80%** granular sand / **20-40%** topsoil.

- ⇒ 3/4" clear gravel may be substituted for embedded bags
- ⇒ See Envirolok bag-fill specifications for full details (**Document BF-20**)

Contact the Envirolok team or local distributor for recommendations on bag-filling methods.



## Collaborative Design Approach

Contact the Envirolok engineering / technical team at [ecosolutions@envirolok.com](mailto:ecosolutions@envirolok.com) for design, engineering, estimate of probable cost and / or material quantities. Services are provided at no charge, unless stamped engineered plans are requested. To get started, our team will need the following:

- **Project Description**
- **Project location**
- **Site plan or topographic map (if available)**
- **Site photos**
- **Length and height of the slope**
- **General soil type (soils report, geotechnical report or a simple picture will do)**
- **Design software can also be downloaded at [www.envirolok.com](http://www.envirolok.com)**

## Design Tips

**Global Stability:** Consult with the Envirolok Engineering & Technical Team or download the Envirolok design software to ensure proper strength global stability are achieved.

**Toe Protection Recommendations:** For projects where scouring is a concern, consult the Envirolok team or see detail sheets **SW2-20 through SW13-20**.

**Note:** Gravel setting base / leveling course may be required in clay or wet soils.

**Drainage Recommendations:**

- Control surface water by diverting overland flow from wall. Consult with an engineer for recommendations.
- Do not discharge runoff into backfill zone.
- Inspect site for indications of wet soils or seeps at wall base and backfill zone.
- See drainage detail sheets **D1-20 through D4-20** for recommended drainage systems.
- Consult with a local engineer for site specific recommendations.

### Design Criteria

**Flow Rate:** 6m / sec

**Mannings Value:** 0.025

# Envirolok Applications



## Slope Applications (>2H:1V)

Face Area: 1 Unit = + - 1 sf

Total Unit Calculation:

$(\text{Slope Ht.} \times L) / .9 = \text{Total Units}^*$

\*For preliminary total purposes only.



## Mattress Applications (<2H:1V)

Face Area: 1 Unit = + - 2.7sf

Total Unit Calculation:

$\text{Slope Area} (L \times W) / 2.5 = \text{Total Units}^*$

\*For preliminary total purposes only.

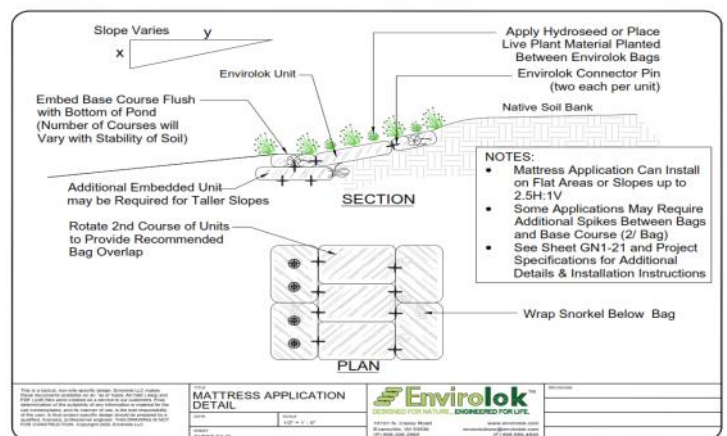
### Slope Heights < 4' (1.2 m)

- Embed a min of 1/2 unit for the foundation course.
- Place coping course in the tie-back position (**S8-20** & **S9-20**).
- Tie-back reinforcement can be used for additional reinforcement.
- Alternative reinforcement, such as geogrid layering or earth anchors may be required for projects adjacent to waterways.

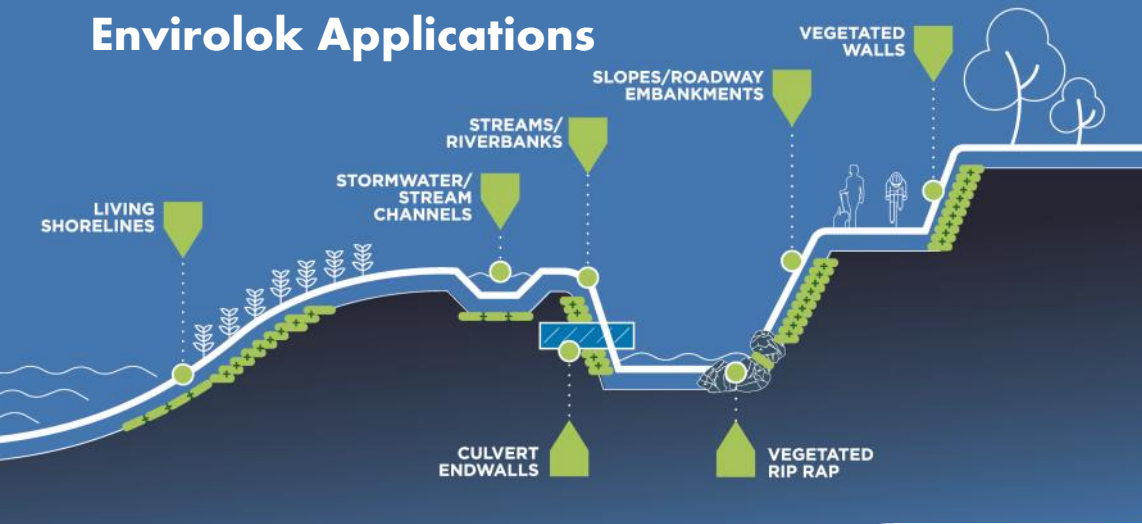
### Slope Heights > 4' (1.2 m)

- Embed a min of 1 unit for the foundation course for every 10 feet in height.
- Place foundation course and coping course in the tie-back position.
- Reinforcement, such as geogrid layering, earth anchors or rock anchors may be required. See detail sheets **RD3-20** through **RD8-20**.
- Slope setbacks > 1:1 typically reduce the length of reinforcement (geogrid or earth anchors).
- Consider terracing tall walls for ease of construction on slopes above 8' in height.

- Embed a min of 1/2 unit for the foundation course
- Alternate the installation pattern to ensure proper overlap of 6" between bags is achieved.
- Alternative reinforcement, such as geogrid layering or earth anchors may be required for projects adjacent waterways or subject to routine flooding



# Envirolok Applications



## Envirolok Design Flow Chart

The Flow Chart included as an overall guideline for general design guidelines. We encourage you to connect with Envirolok's Engineering & Technical Support Team for design and construction recommendations.

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## Design Flow Chart



1

### Is your slope >2H:1V?

- If yes, use slope application details SD (1-3)-20 & SD (6-14) — Go to #2
- If no, use mattress application details SD(4-6)-20 — Go to #7

2

### Is there runoff onto the slope or are the existing soils wet?

- If yes, use details D(1-4)-20 — Go to #3
- If unsure, consult the Envirolok Team

3

### Does the slope height exceed 4'?

- If yes, advanced reinforcement is necessary — Go to #4
- If no, use tie-back reinforcement RD(1-2)-20 — Go to #6

4

### Can the area be excavated?

- If yes, use details RD (3-6)-20
- If no, Go to #5

5

### Retained Material

- If retained material is soil, use details RD(6-7)-20 — Go to #6
- If retained material is bedrock, use detail RD(8)-20 — Go to #6

6

### Does your slope application project include a waterway or shoreline?

- For low energy water conditions, see detail SW (3)-20 — Go to #8
- For high energy water conditions, see detail SW (4-11)-20 — Go to #8

7

### Does your mattress application project include a waterway or shoreline?

- For low energy water conditions, see detail SW (1)-20 — Go to #8
- For high energy water conditions, see detail SW (2)-20 — Go to #8
- For stream and stormwater channels, see details LF (1-4)-20 — Go to #8

8

### Vegetation Methods

- For plug plantings or hydroseeding, see detail VD 1-20
- For brush layering / bare roots see details VD 2-20
- For live stakes see detail VD 3-20
- For sod / sedum mats / vegetated mats see detail VD 4-20

**WATERWAYS | SLOPES | LIVING SHORELINES**