

### EROSION CONTROL ON LANDFILL CAP WICHITA, KANSAS, USA

#### SLOPE PROTECTION

##### Product: Reno Mattress

###### Problem

Herzog Landfill is a publicly owned facility in Wichita, KS. Water run-off from the landfill cap was collecting and flowing in channels down the faces of the landfill, focusing the erosion problem.

Turf Reinforcement Mats (TRMs) and Rolled Erosion Control Products (RECPs) were used to protect the landfill cap from continued erosion and to establish vegetation. Despite this, the erosion was not stopped and soon the buried trash within the landfill was being exposed. A more robust solution was required that offered greater shear resistance than permanent TRMs and RECPs.

###### Solution

Reno mattresses were selected as the optimal solution as they offered;

- Flexibility and the ability to settle with the landfill without sustaining damage
- High shear resistance
- Permanent erosion protection
- Ability to revegetate easily

The erosion problem existed on all four sides of the landfill cell. Herzog Engineering approached Maccaferri for design assistance, and used the Maccaferri Macra 1 2002 channel design software. This software was used to size the channels required on the landfill cap, and protect it by inserting a variety of erosion control products. The analysis verified that the tractive forces applied by the flow could be accommodated by the shear resistance of the Reno mattress channel lining system selected.

Macra 1 also allows the user to include soil bioengineering techniques and can also check the flow regime with a fully vegetated channel.

Client name:

CITY OF WICHITA

Main contractor name:

HERZOG CONSTRUCTION

Consultant:

HERZOG ENGINEERING

Product used:

3,350 SQUARE METERS OF RENO MATTRESS

Dates:

Design: SEPTEMBER 2002

Construction: MARCH 2003



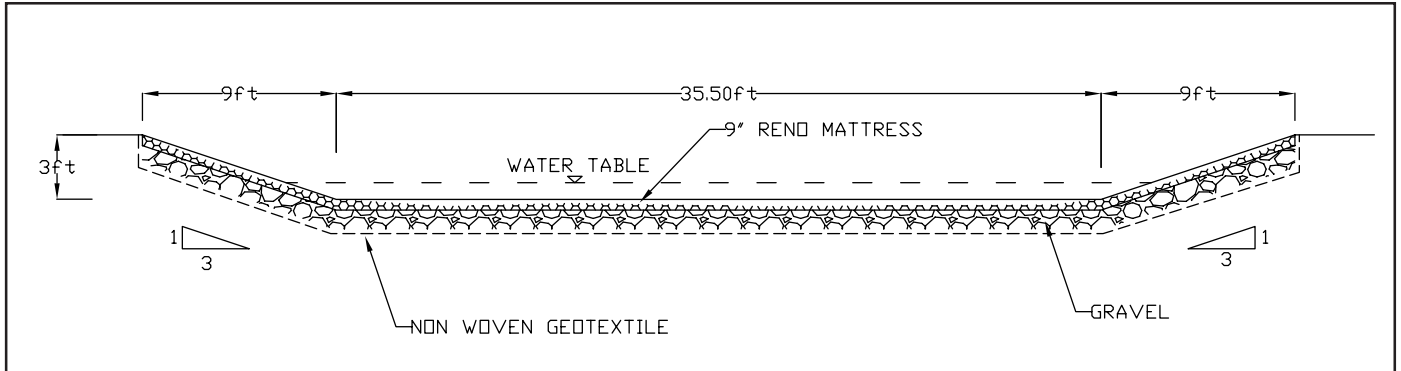
Erosion control provided by Reno mattresses



Rip-rap at end of a drainage channel to dissipate energy



Detail of Reno Mattress erosion protection



Erosion control provided by Reno mattresses - typical section

A 9" thick Reno mattress was required to protect the slope from erosion; the thicker the mattress, the greater the shear resistance.

The Reno mattresses were constructed upon a non-woven needlepunched polypropylene geotextile. This geotextile limits the wash out of fine material from beneath the mattress when it is exposed to water flow. If the fine material was allowed to wash out, voids would develop beneath the mattress.

When constructed correctly, Reno mattresses offer more than twice the shear resistance of loose rip-rap with the same size stone (Shields coefficient for Reno = 0.14, and Rip Rap = 0.047). This increased performance is due to the 'confining' action of the mattress wire mesh, which limits the rock fill from moving around within the basket under flow conditions.

It is therefore important to overfill Reno Mattresses by 1" and stretch the lids tightly before fastening them. This confines the rock successfully and also allows for some future settlement without affecting performance. Overfilling and stretching the lids also reduces the movement of stone within the mattress which can cause accelerated degradation of the mesh.



Run-off collected by 'collector ditch' at the toe of the slopes



Overfilling and stretching of Reno mattress lids (different project)

## Working with Maccaferri

For over 120 years, Maccaferri has provided engineering expertise to clients around the world. We believe that the combination of our professionalism, design software, technical and site assistance service and our aim of providing the best products in the market, sets us apart from our competition. We hope you agree.

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