MACCAFERRI

CASE HISTORY

*Ref: USA001 - Rev: 001, Issue Date 12.12.2003*

# EROSION CONTROL OF MINE SPILLWAY
MARQUEZ, NEW MEXICO, USA

## EROSION CONTROL CHANNEL LINING
**Product:** Gabion Mats

### Problem

The owner of a mining claim in central New Mexico elected to close the property because of declining commodity prices.

In order to close the mining operation it was necessary to install a spillway 'overflow' over the existing dam to control the volume of impounded water.

The existing dam was of a clay core construction. The spillway had to be designed to limit the significant shear forces and erosion in the overflow channel. Also any erosion control solution had to accommodate local differential settlements. The expected shear forces would exceed that offered by a high performance permanent erosion control mat, and a more robust solution was required. The strength and flexibility of double twisted mesh gabion mats offered an ideal solution.

Channel & terrace preparation

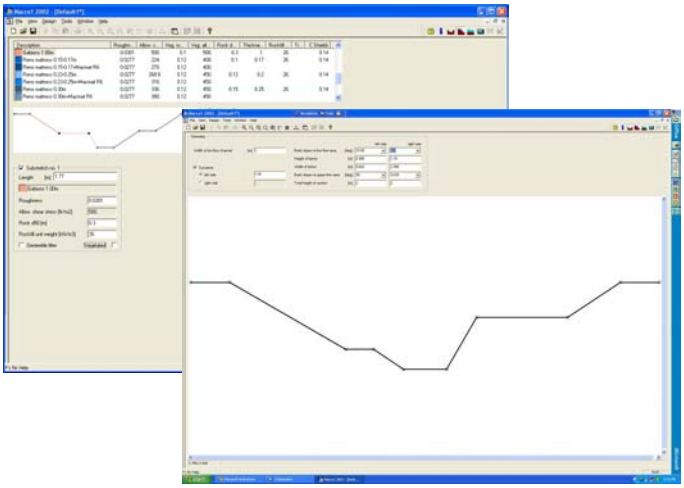
### Solution

With the assistance of Maccaferri's Technical Department, the project engineer detailed a series of eight connecting gabion drop structures. These controlled the water level over a 24 foot change in elevation from the dam crest to the flow level in the existing drainage channel. By converting kinetic to potential energy, the erosion shear forces were reduced.

The drop structures were designed in part using Maccaferri design software; "Macra 2" for the drop structures, and "Macra 1" for the channel. "Macra 1" is available to designers and contractors if required

Drop structure detail

Following discussions with the project team, Maccaferri manufactured 99' long Gabion Mats with 3'x3' cells to reduce the cost and time of the installation through economies of scale. In addition, 27' and 51' long Gabion Mats were also specially manufactured to suit the site requirements, further helping the contractor.



Macra 1 design software by Maccaferri

Designer:

MACCAFERRI INC.

Product used:

GABION MATS, RENO MATTRESSES, MACTEX MX275

Date of building:

SUMMER 2001

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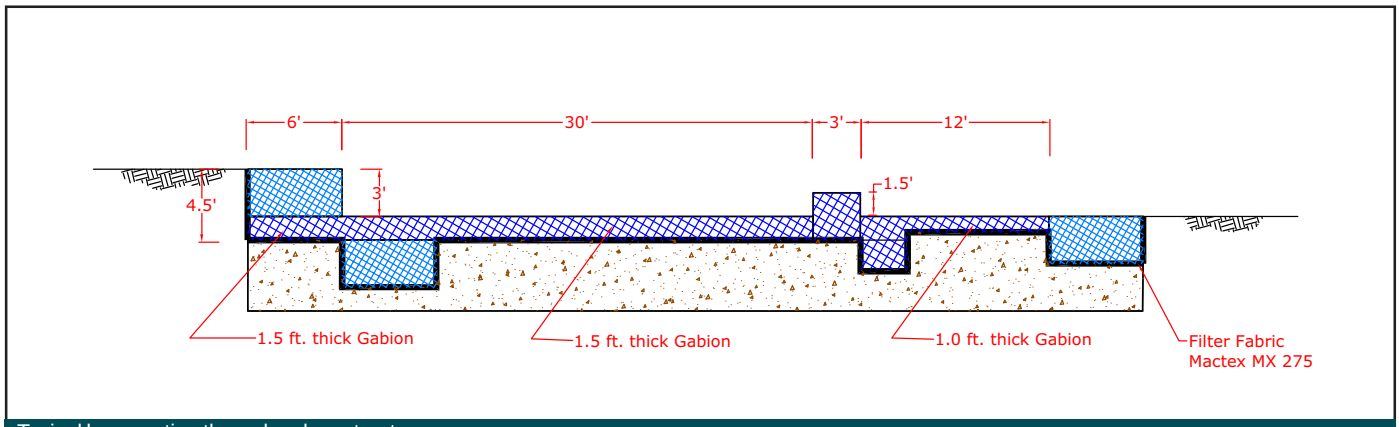


Typical long section through a drop structure

Retention pond at low water

Drop structure at low water

The Gabion Mats were constructed upon a non-woven needlepunched geotextile - Maccaferri MacTex MX275. This acts as a separation and filtration layer between the foundation material and the gabion erosion protection. The geotextile limits the “wash-out” of fine material from beneath the Gabion Mat under high flows and storm conditions.

If local erosion does occur beneath the mats, the flexibility of the double twist mesh allows the gabion to settle and continue protection without sustaining damage.

The Maccaferri double twist hexagonal mesh was PVC coated due to the water environment. Double twist mesh is very robust, and can accommodate large differential settlement without rupturing or ‘unzipping’. The junction strength, or weave, between adjacent wires in the mesh is as strong as the wire itself. Stresses in the mesh can therefore be dissipated in two dimensions throughout the mesh. This ability continues even if wires are cut or damaged.

This is a vital characteristic particularly in critical infrastructure applications where there is the potential for differential settlement.

### 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.

**Headquarters - East Coast**
10303 Governor Lane Blvd, Williamsport, MD, 21795
Tel.: (301) 223 6910 Fax: (301) 223 4356

**MACCAFERRI INC.**
E-mail: hdqtrs@maccaferri-usa.com
Web site: www.maccaferri.com

**West Coast**
3650 Seaport Blvd, West Sacramento, CA 95691
Tel.: (916) 371 5805 Fax: (916) 371 0764