

CHLOORKOP EASTERN CANAL
MIDRAND, GAUTENG

HYDRAULIC & EROSION CONTROL / CHANNEL LININGS

Product: Reno Mattresses, Gabions

Problem

Chloorkop effluent farm is located approximately 10km east of Midrand and is operated by Sentrachem, a subsidiary of the DOW Chemical Company. In terms of the water regulations all “clean water” must be diverted around the farm. In order to comply with this regulation, river diversion canals on both the eastern and western sides redirect water around the property. Since the farm was originally established in the 1950’s, the residential development around the farm has increased resulting in additional run-off being channelled into the natural watercourse. To cater for the increased run-off quantities the existing eastern canal of the farm, whose purpose is to divert the natural river course past the salt-water dams into the spruit below, needed to be upgraded.

Solution

The design detailed the construction of an earth canal protected in areas of high velocities with Reno mattresses and gabion retaining walls to stabilise the embankments. The gabion products are manufactured from heavily zinc coated double twist hexagonal mesh to SANS 1580:2005.

To halt degradation of the bed canal, a series of vertical weirs were constructed so that the canal slope between the toes and the crests were stable for the soils concerned not to erode, with the excess water energy being dissipated at the toe of each structure.

Gabions and Reno mattresses were also used in areas where the occurrence of hydraulic jumps was expected and where changes in horizontal alignment occurred.

The vertical gabion weirs and Reno mattress spillways were concrete capped to prevent the movement of the rock fill within the baskets and prevent the excessive abrasion of the double twisted wire due to water dissipation. Herbaceous and woody plants were readily established within the stable environment of the stone fill.



Gabion weirs to dissipate energy and protect the bed canal



Channel lining immediately after installation



Natural vegetation established a few months after completion

Client name:

SENTRACHEM

Main contractor name:

EWT CONSTRUCTION

Consultant:

ALAN ROBINSON CONSULTING ENGINEERS

Product used:

GABIONS, RENO MATTRESSES

Construction info:

Construction date:	DECEMBER 2001
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Completion date:	AUGUST 2003
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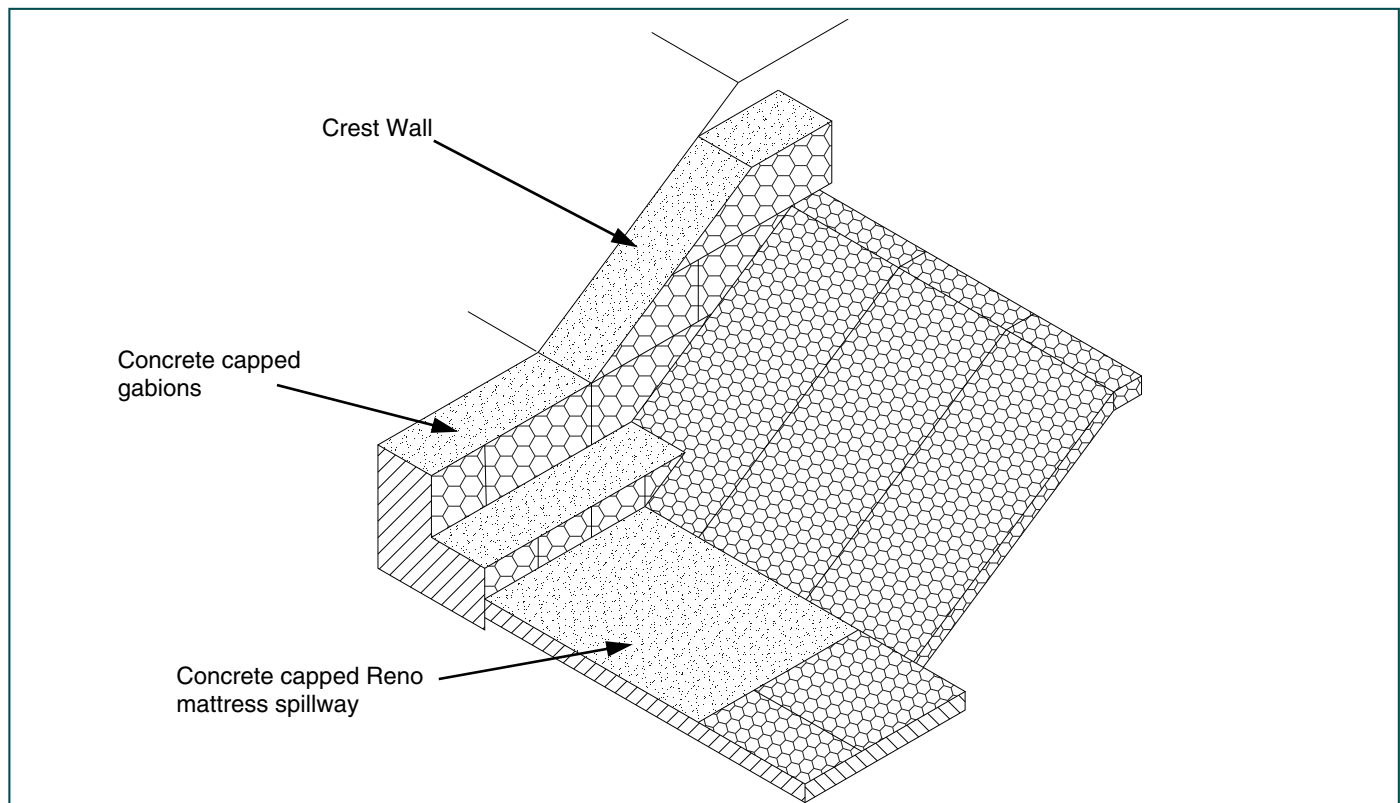
Solution (Continued)

Due to budgetary requirements it was decided that the canal had to cope with a 1:20 year storm, with the 1:50 year accommodated within the grassed benched areas. The 2km long canal amounted to approximately R4,5 million.

Benefits

- Technical support was provided to the engineer in the form of design assistance, AutoCAD drawings, site assistance and training.
- Construction training was given over a period of 3 days which improved production by 30% and quality of work by 100%.
- The use of unskilled labour allowed for use of 25 to 30 unskilled labourers that packed between 50 and 60m³/day.
- The flexibility of gabions and Reno mattresses permit differential settlements and movements without fracture, necessary for river and stream rehabilitation projects.
- Gabions are permeable structures and allow for quick and easy vegetative growth to establish and for the natural environment to take over.

- By concrete capping horizontal surfaces of vertical drop structures gabions are capable of dissipating energy without sustaining damage.
- Gabions proved to be the most cost effective solution when considering the total project objectives: labour intensive, technical integrity, fit for purpose and value for money.



Typical Weir Detail

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