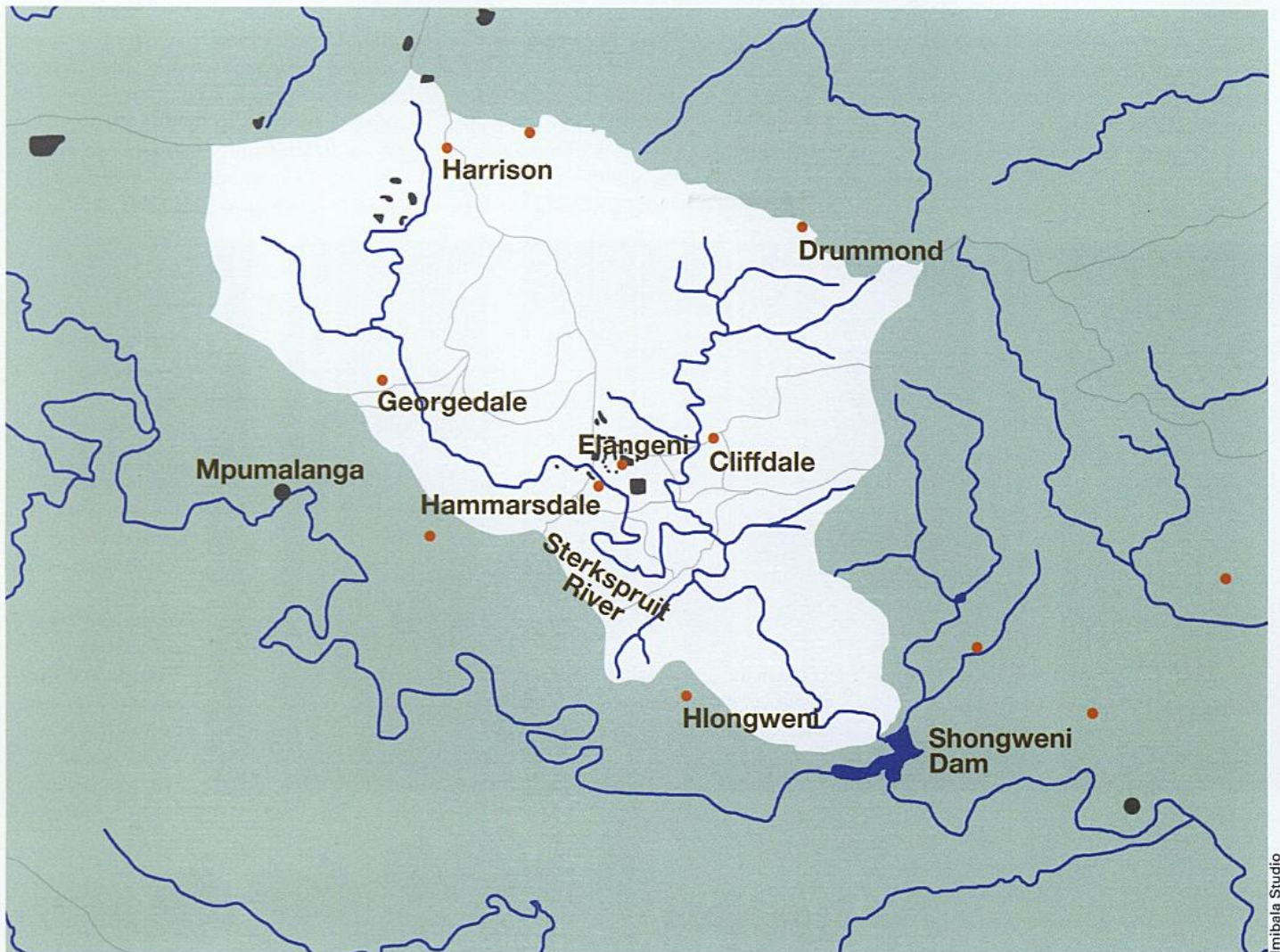
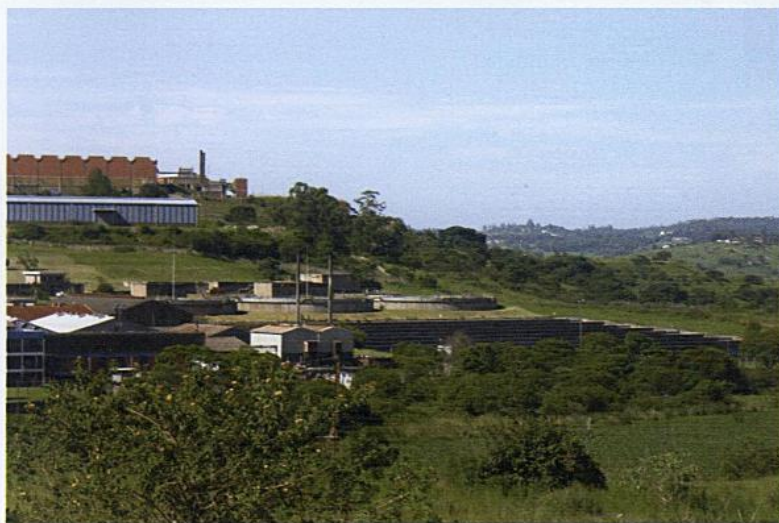


Co-operation among different parties combined with due intervention set the Hammarsdale industrial township on the path towards sustainable business.

TOWARDS



Imibala Studio



Engela Meyer



eThekweni Municipality

The Hammarsdale wastewater-treatment works has volumetric design capacity of 27 Ml/day.

The Hammarsdale industrial node between Durban and Pietermaritzburg was created as an industrial decentralisation hub in the 1970s – right between the towns of Hammarsdale and Mpumalanga. The then Department of Co-operation &

Development created the industrial hub to attract the textile industry in particular. The key objective was to provide cheap, labour-intensive industry close to the former KwaZulu homeland but little regard was given to issues of environmental sustainability.

As time went by, the Hammarsdale wastewater-treatment works became overloaded with colour and salt, primarily from the many textile industries in the area. These factories all have dye baths. Preparation of the yarn for dyeing as well

cleaner production



Engela Meyer

Opposite: Pollution eventually flowed into the Sterkspruit River and even threatened to move downstream and contaminate the Shongweni Dam. At this point, the colour is diluted to acceptable levels and no problems downstream of the dam had been reported for more than 10 years.

Using suitable screening removal equipment and a dissolved air flotation unit, the Rainbow Chickens abattoir can pre-treat and has thus reduced its waste load by 50%.

as the actual dyeing and rinsing contaminate the water. A lot of dyes can be taken out by a conventional wastewater-treatment plant but some reactive dyes, especially of the colour red, cannot. Also associated with the dyeing process is salt-dosing. Different types of salt are used that are usually very difficult to take out. Pollution was eventually passed on to the Sterkspruit River and even threatened to move downstream and contaminate the Shongweni Dam.

According to Chris Fennemore of eThekweni Municipality's water and sanitation department, talks about the pollution problems in the Sterkspruit catchment, a sub-catchment of the Umlaas River, began around 1998. At that point in time, Fennemore was working with Umgeni Water, bulk water-supplier in the area.

Uncertain ownership

One of the first obstacles in addressing the environmental issues was the ownership of the Hammarisdale wastewater-treatment works. Taking over ownership and operation of the Hammarisdale wastewater-treatment works in 1982 from the Department of Water Affairs & Forestry (DWAF), Umgeni Water optimised the purification process over the next 20 years by changing aeration and adding chemical dosing. But, in terms of the 1997 Water Services Act, eThekweni Municipality is actually the relevant water-services authority in the area and is, therefore, responsible for the wastewater-treatment function. Discussion on the ownership issue commenced but it was obvious that agreements would not be reached easily. In the meantime, Umgeni Water obviously saw no need to invest more money in the

treatment works so pollution problems were not addressed. "That was a 'lose-lose' situation," says Fennemore. "Nobody was taking responsibility and the environment was suffering."

A few individuals from eThekweni and Umgeni sat around a table arguing that the environment could not wait for political decisions and some "win-win" solution should be sought to address the issues. "One of the first things we decided was to ring-fence the project so that Umgeni would not incur any extra costs," says Fennemore. "It was decided that whatever costs incurred would somehow be recovered. We 'upped' the tariffs paid by industry over two to three years. This actually proved to us that industry is willing to get rid of its waste."

One of the problems with the tariffs was that it was a flat tariff – no matter what quality the effluent was. For instance, effluent from a local Rainbow Chickens abattoir was taking up 75% of the organic load of the water-treatment works and it was still paying the same as another consumer downstream. Because of the abattoir's high organic load, the wastewater-treatment works was actually at full capacity although it was only receiving about 30% of the volume it could potentially accommodate.

A further challenge was, therefore, not only to increase the tariff but to make it more equitable. There had to be an incentive for companies to reduce their effluent loads.

Waste minimisation

Already involved in the area since 1993, the Pollution Research Group (PRG) at the University of KwaZulu-Natal, funded

by the Water Research Commission, initiated a waste-minimisation club in 1999 to encourage industry to move towards cleaner production.

According to the PRG's official website waste minimisation can be defined as the application of a systematic approach to reducing waste at source. In other words, preventing waste in the first place rather than installing expensive end-of-pipe treatment systems to solve the problem. Waste minimisation is an activity that relates to all inputs and outputs from an industry, business, site or process. Anything that goes into a process that does not come out as product is termed waste. This can be in the form of emissions to air, land and water, rejects, time and so on. Waste is not simply material excess to requirements but represents a loss in profits and can reflect as much as 1% to 4% of the turnover of the company.

In 2000, DANIDA added funding to undertake specific waste-minimisation projects in the area. This initiative also funded the compilation of a cleaner production guide for regulators. The combined projects resulted in reported savings of R10-million over three years from five industries. The savings were mainly in energy (28%), effluent treatment costs (25%) and water (22%) respectively. Little or no effect was observed, however, on the quality of effluent that was delivered to the Hammarisdale wastewater-treatment works.

"The Hammarisdale works could only treat so much effluent so we had to look at improving the quality of the effluent entering the works," Fennemore points out.

Bargaining chip

In the meantime, eThekweni Municipality was considering the implications of taking over the operation of the Hammarsdale works. Umgeni Water was operating just a few treatment works as it was focusing on expanding its role as a bulk-water services provider. eThekweni, however, has about 30 wastewater-treatment plants it owns and operates; providing economy of scale from a technical and operational point of view. Calculations indicate the wastewater could be treated at about half the price Umgeni Water was paying.

By now industry was accustomed to Umgeni's higher tariff on waste loads. The situation provided eThekweni with a valuable bargaining chip: it was willing to pass on the benefit of the reduction of tariffs as soon as industry complied with better standards.

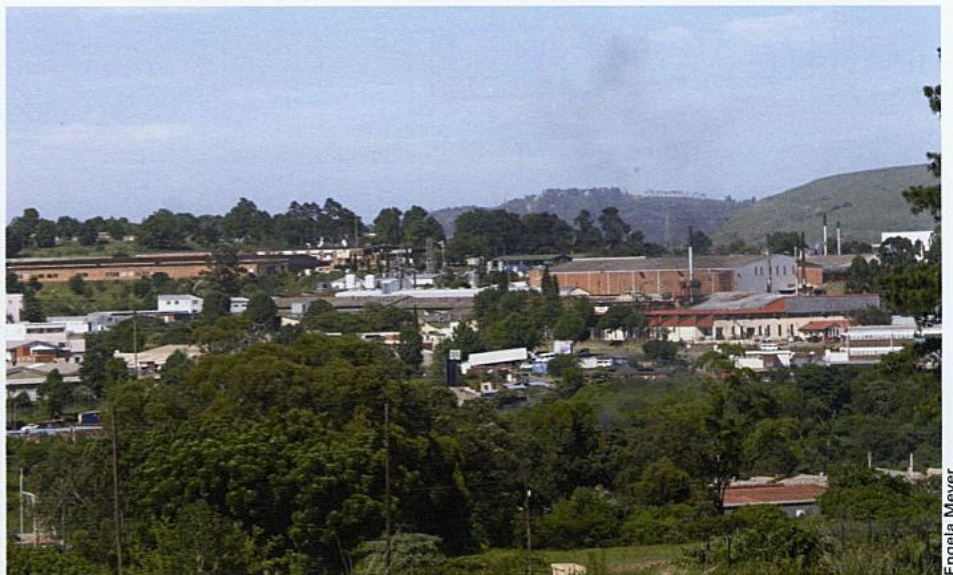
Setting standards

"The next phase was to determine a reasonable standard of water quality," says Fennemore. "What we wanted was to maintain a certain water quality in the river." In terms of legislation, the catchment management agency (CMA) for the area should set the river quality targets. In the absence of a CMA, DWAF is responsible for setting targets by default. The targets would be complex, encompassing river health, flow and water quality. In order to establish standards, a reserve determination should be completed. Unfortunately reserve determinations are extremely expensive and river catchments must be prioritised. DWAF indicated that the Sterkspruit/Umlaas River catchment reserve determination would not be undertaken for many years.

Again the role players involved decided not to let the slow-moving processes of government interfere with solving immediate problems. "We sat around the table and decided that, for the time being, colour is the biggest issue," says Fennemore.

Monthly river and effluent data was available for 10 years from Umgeni Water. Information on the electrical conductivity of the river upstream, effluent from the wastewater-treatment works and the river downstream, as well as the flow of the works was available. Using available data, the dilution available in the river was determined and the effect of dilution of colour was used to produce duration curves for different effluent-discharge qualities arising from the treatment works. Subsequently three samples were prepared and 30 relevant people were questioned about the acceptable intensity of colour in the river.

This addressed only the colour standard and did not take into account the excessive chemical oxygen demand (COD) load. The abattoir in the area was subsequently targeted as the main contributor to organ-



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The textile industry is a major water user and polluter facing increasingly tight legislation on water discharges, air emission and waste production.

ic load. By using suitable screening removal equipment and a dissolved air flotation (DAF) unit, it was agreed that the company could pre-treat and reduce its waste load by 50% and thus free more than 30% of the capacity of the works. This would provide capacity for sanitation upgrades in the town of Mpumalanga.

Tariff structure

The eThekweni Municipality bought the treatment works from Umgeni Water in July 2003 and devised a plan to start reducing the effluent discharge from the factories. A new tariff rate was introduced:

If a business implemented best available techniques (BAT) and improved efficiency, they would receive a 30% reduction in their tariff from the municipality.

If the company also complied with the new discharge standard, they would receive a 70% reduction on their old Umgeni Water tariff.

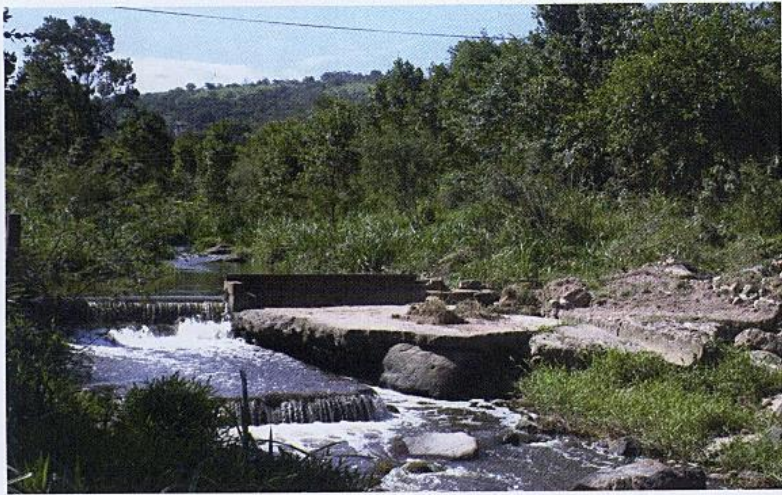
In addition the Norwegian Pollution Control Authority assisted with the setting up of a new five-year integrated pollution control permit. The permit application formed the basis for the development of an envi-

ronmental management system. The targets for colour were then inserted into the permits. In January 2005 each industry was issued with a new five-year industrial effluent discharge permit, which explains the environmental standards and targets each is expected to meet.

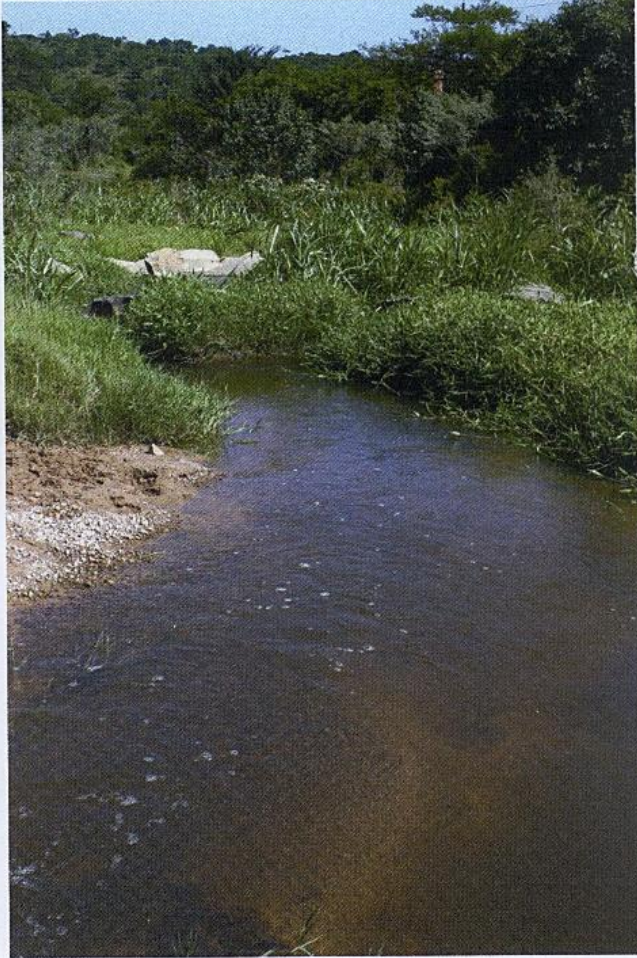
Timing is everything

Working in favour of this initiative was the fact that co-operation, planning and research commenced before final political decisions were taken. The relevant proposals were on the table well in advance of the Hammarsdale works being transferred to eThekweni Municipality. "We phased the tariffs in over three years," Fennemore points out. "To give industry time to get its house in order and they had a year's warning before then so it was actually four years."

Gelvenor Textiles was the first company in Hammarsdale to achieve the cleaner-production and colour-standard target. Since March 2006, the company has reportedly managed to save about R72 000/month. Others are also commissioning pre-treatment plants. Some com-



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panies are still reluctant but Fennemore is confident that they were given due warning before the colour standards will be enforced in July 2008.

Managing the functioning of industry within this catchment area is an ongoing process. Progress can already be seen in the improvement of the colour of the river water. A major concern is the difficult economic conditions the textile industry is experiencing but this could also be viewed as an opportunity for these companies to streamline their processes, cut costs and leave a smaller environmental footprint. ■

The benefit of the initiative – improvement in water quality – is evident downstream in the Sterkspruit River.