Metering of non-revenue water

Ekurhuleni, South Africa

water scarcity impact

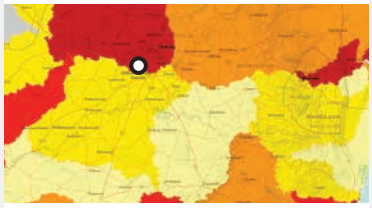
Reduced withdrawal	
Reduced consumption	●
Improved water quality	
Increased productivity	●
Net basin benefit	

volumetric impact
5 800 000 m^3/yr

capital cost
$2 500 000

estimated unit cost of water
<5 ¢/m^3

Water Stress
Ekurhuleni, South Africa



Arid & low water use
Low (<10%)
Low to med (10-20%)
Med to high (20-40%)
High (40-80%)
Extremely high (>80%)
No data available

Water Stress Map:
Gassert, F., M. Landis, M. Luck, P. Reig, and T. Shiao. 2013. "Aqueduct Global Maps 2.0."

Confidence level
Low Medium High

Water Scarcity Impact Key
Main Minor

Credits
We wish to acknowledge the input of Johan Vorster and Dries Kruger of Ekurhukleni Metropolitan Municipality and Brad Astrup, Willem Wegelin, Tshilidzi Godzwana and Mthokozisi Mlotshwa of WRP (Pty) Ltd in the preparartion of this case study.

Project Overview

Ekurhuleni Metropolitan Municipality (EMM) is the industrial heartland of South Africa and supplies approximately 314 000 000m^3/year to 800 000 households. Metering of the top consumers in EMM had not been a high priority for many years with the result that many of the supply meters to existing consumers were either broken or unreliable with non revenue water estimated to be around 50% of the water being used.

In 2010 EMM launched a campaign to consolidate multiple connections into single metered supplies. The main catalyst for the project was an increasing awareness that large quantities of water were being supplied to industry without being billed. While the replacement of meters, including the consolidation of multiple connections, was the main feature of the project, other important components included the identification of illegal connections and the identification and repair of leaks. The project was the overall winner of the South African Government's 2012 Water Conservation Awards and is now being extended to include almost 25 000 additional bulk consumer meters. Extensive work was done with consumers to explain the whole process, as a result, despite the fact that around 75% would be faced with increased water bills, there was no resistance to the project.

Key Elements

- Targeting of top 500 consumers by volume of water.
- Comprehensive water audit allowing the identification of all existing connections to each consumer.
- Zero pressure testing to check for additional supply connections not identified during the water audit.
- Drawdown testing at fire hydrants to determine hydraulic capacity within the municipality system and to support sizing of consolidated meters.
- Design and implementation of consolidated supply including metering of the top 500 consumers.
- Project cost was $2.5m.

Key Outcomes

- Decrease of non-revenue water estimated at 5 800 000m^3/year for the first 213 consumers.
- Increased revenue for Ekurhuleni Metropolitan Municipality estimated at $5.4m/year.
- Reduced wastage of water through leakage repairs especially on internal reticulation networks.
- Creation of 20 full-time jobs and 4 660 man-days of employment over two years.

Ekurhuleni, South Africa

Intervention Features

¬ Removal of unmetered water supplies ¬ Industrial water metering ¬ Water audits ¬ Stakeholder engagement

Project Levers.

(1) Comprehensive water audit:

In order to maximise the potential return on the cost of investigations and remedial actions, it was decided to focus on the largest consumers; this is where the largest savings could be made rapidly and cost-effectively. The target area was one in which metering was known to be old and in poor condition.

The Field Audit involved locating and capturing all information relating to the consumer's water supply and water infrastructure on the property. An assessment was also made of the consumers water demand in terms of fire fighting, industrial and domestic demand. This audit was supported by extensive analysis of the system including:

- Zero pressure testing; Since many of the existing connections and associated meters were hidden underground and often under years of accumulated debris and rubbish it was necessary to carry out zero pressure tests at all consumer sites in order to check for the presence of any other additional connections to the reticulation system.
- Drawdown testing; Drawdown tests were conducted at fire hydrants on the municipal network to determine the hydraulic capacity within the municipal system. These tests provided an indication of the potential within the municipal supply system to provide water for fire fighting purposes and were also used to support the consolidated meter sizing.

(2) Consumer engagement:

The comprehensive evidence base gathered was critical in engaging with consumers and local politicians. In parallel with the technical audit this enabled close and frank communication between the project team/ Municipality and the consumers who were highly cooperative as a result.

(3) Industrial water metering:

Some consumers had as many as 20 separate connections some with meters and some without. A meter sizing model was developed to assist in the calculation of maximum realistic demand and the consolidated single meter for each consumer size accordingly. By the end of the three year project designs had been completed for 213 consumers with one or two new meters installed at each.

Outcomes and Challenges

The increased revenue calculations undertaken for the first 250 large industries which have been audited and provided with a consolidated water supply connection indicate that the annual revenue to EMM has increased by up to $5.4m. The resulting payback for this project is therefore less than 12 months which is highly cost effective. It is too early to state whether there has been an impact on demand since the industries started paying for all their water, but this is likely to be the case.

A key element in the success of this project has been the careful auditing of the water use and water billing prior to the project implementation compared to the post implementation results. Through proper and reliable auditing of the results, it was possible to highlight the real benefits from the project in such a manner that the Municipality officials and high ranking politicians could clearly see the benefits of extending the process to cover another 25 000 bulk water connections. The additional project will be undertaken over a ten-year period and is scheduled to commence in 2014.

A key challenge throughout the project was to ensure that records are kept that can provide a robust evidence base for what has been achieved. The data must be presented in a clear and concise manner so that the local politicians and municipal managers can see the benefits from the project.

Above: Unmetered and metered supplies exposed. (© WRP (pty) Ltd)