Leading the way with INNOVATION IN WATER & SANITATION

Head of eThekwini Municipality's Water and Sanitation Unit, Neil Macleod, manages an organisation with 3 000 staff members and an annual budget in excess of R5,2 billion. Debbie Besseling speaks to him about his extensive experience in the sector and some of the unit's innovative research collaborations.

What does your position as Head: Water and Sanitation entail?

My job is to make sure that the eThekwini Metropolitan region, a municipality which comprises 3,5 million people, has access to quality drinking water supply and sanitation services that disposes of sewage safely.

You have been with eThekwini Municipality for some 40 years, tell us about the early years of your career?

I was initially a loan student with the Council, they assisted me with paying for my studies. In return I worked for them for a period of four years to pay back the loan. I undertook vacation work for the Council and was involved in building the 4th Aqueduct which serves as a key bulk water main supplying the Municipality. I also worked on the Durban Heights Waterworks project, as I had specialised in water supply and hydraulics at University. I started in the Design Branch, being involved in designing water trunk mains and reservoirs. I gained a lot of experience during the five years that I was in the branch and then was made Manager of Operations. I progressed relatively quickly in the organisation and for the past 21 years have been the heading up the Water and Sanitation Unit.

What milestones can you highlight that have taken place in terms of water and sanitation developments at eThekwini over the past two decades?

A very significant development was in 1992 when the restructuring took place. The City went from running itself with a Treasurer and a City Engineer to creating business units, where they appointed heads to run every aspect from finance, human resources, through to engineering. These individual businesses were ring-fenced with their own accounts. That was a major change in terms of the traditional concept of municipal engineering.

The second change that I would like to mention that has taken place over the last 12 years is the way we have brought services to people. In the year 2000, we had a million people without access to services. Since that time the number of people that needed services has grown by a further 400 000. However, in the intermediate time, (other than approximately 50 000 people), the residents of our Municipality now have access to water services. Wiping out the backlog and rolling out services at scale to over a million people, in a relatively short period of time is quite remarkable.

eThekwini Water and Sanitation is known for its innovation. Tell us about that?

At eThekwini Municipality we have created a culture of innovation. There is a list of innovations that have come through over the years. If we look at our history and go back to 1997, that was when we started with free basic water. At that time we were extensively involved in engaging with our communities and undertook research to bring in free basic water, which became a national

policy after 2000. This, in turn, led to the invention of flow limiters that enabled us to manage the amount of water delivered to individual homes. The Debt Relief Programme is a relatively new initiative that tackles our debt recovery – we have collected well over a R100-million through this project. These are just a few of the innovations that have been developed by eThekwini Municipality.

What have been some of the highlights of your career?

On 3 January I had been with the Municipality for 40 years. I have really enjoyed my job and that for me is a highlight of my career. We have been given the political support and an environment in which we can be innovative and try out new ideas and technologies, allowing us to move to new levels. We work in a creative environment where our people can constantly develop. Our work has attracted a significant amount of international attention. As a result I have been fortunate to have met many interesting people, including Prime Ministers, Queen Elizabeth II of the United Kingdom and Bill Gates. Also of significance is how we have made a difference in people's lives by giving 1,3 million people access to water.

What kind of challenges does the municipality face?

We are typical of most of South Africa's municipalities in meeting the rapid demand for services as a result of urbanisation. We have up to 30 000 families a year moving into the municipality requiring services. That's over 150 000 people moving into the metropolitan area in one year. So we have to wipe out the backlog while also providing services to the people moving into the urban areas. This is an international trend, it is not just a South African problem.

Another challenge for us is non-revenue water (NRW), and the theft of water. The damage this does to our network and to our overall liability is enormous. A few years ago our NRW was 45% and in more recent months it has been 34%. Half of our NRW is due to water theft and because we have rolled out reticulation across the entire municipality, water is available everywhere.

Having skilled artisans is another challenge. We have been very fortunate that we have been able to retain our skilled management. We just don't have as many plumbers and mechanical artisans and electricians as we used to have. We need more skilled people who work with their hands.

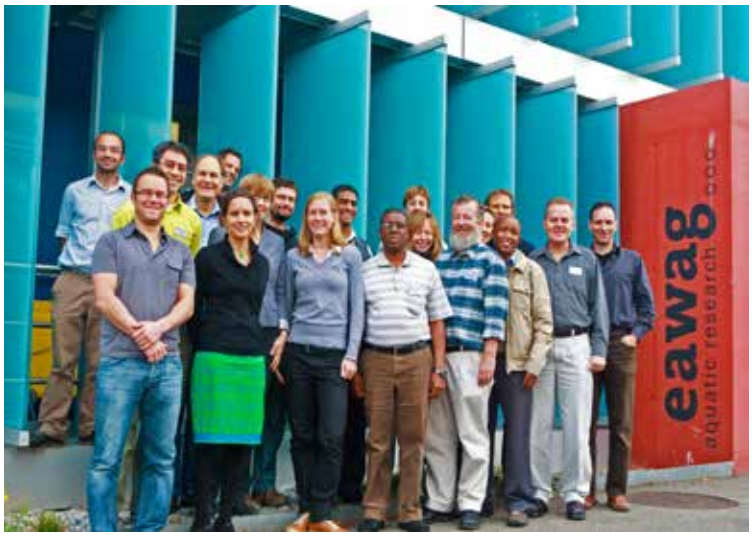
I must make mention of fraud and corruption which seems to be a new cancer that is attacking our organisation and many others across the country. There needs to be harsh penalties to pay for corruption.

eThekwini has been involved in several water and sanitation innovations, please tell us more about your latest research partnerships:

Reinvent the Toilet Challenge: The Pollution Research Group (PRG) in the School of Engineering at the University of KwaZulu-Natal has received a grant from the Bill and Melinda Gates Foundation (BMGF) to participate in the *Reinvent the Toilet Challenge* (RTTC). The Challenge's end objective is to produce a new-generation self sustaining toilet that is able to convert human waste into sterilised fertilizer, potable water, mineral salts and electrical energy. The new-generation toilets will, in contrast to the current standard waterflush toilet, avoid the use of large amounts of clean water and energy to dispose of excreta and instead will treat human waste as a valuable resource. The toilet will be off-the-grid, doing away with the need for a connection to large electricity, water or sewerage networks. Affordability is a key goal of the RTTC, with a target combined capital and operating cost for the toilet of less than 10 US cents per person per day.

The toilet will integrate several operations to process the different components of the waste stream (faeces, urine, rubbish and wash-water) and recover the useful constituents. The PRG's work covers aspects including the design of a pedestal capable of splitting the four waste components at source, characterisation of the waste input streams, and processes for treating the faeces and urine.

Nutrient recovery through urine separation: Role of health and hygiene education: Health and hygiene education is one tool that has been used in many countries in the course of urine diversion



Neil Macleod (second from right) with team members working on research related to nutrient recovery through urine separation.

Over the years eThekwini has rolled out thousands of urine diversion toilets to needy residents.

implementation to encourage acceptance, use and maintenance of the facility. Hygiene education is an indispensable part of water supply and sanitation projects, it ensures improved health and sustainability of asystem after the assistance of technical experts has been withdrawn. This project aims to explore the influence of health and hygiene education on the social acceptance, utilisation and maintenance of urine diversion toilets.

***The Newlands-MashuDEWATS project*:** The eThekwini Municipality in partnership with the PRG are investigating a modularised decentralised wastewater treatment system (DEWATS) plant for on-site waterborne sanitation. The plant was designed by the non-profit organisation, Bremen Overseas Research and Development Association (BORDA) which specialises in the design and implementation of DEWATS plants.

A typical view inside one of eThekwini's communal water and sanitation blocks.

***Communal ablution blocks*:** The objective of this study is to explore existing and potential opportunities and challenges to the provision of communal water and sanitation facilities to low-income consumers living ininformal settlements of eThekwini Municipality. This study was carried out in 31 informal settlements. In all, a total of 50 communal ablution block sites were surveyed. These blocks consist of two prefabricated shipping containers modified to meet appropriate communal sanitation standards.

The containers (serving male and female users respectively) service 50 to 75 dwellings at a maximum distance of 200 m from the facilities. Male blocks have two washbasins, two urinals two toilets and two showers. Female blocks have two washbasins, two or more toilets and two showers. Provision is made for a store room and for (two)external laundry basins. The municipality has installed a total of 350 blocks in 125 informal settlements and is working towards increasing this number to 2 200 by 2015. Communal ablution blocks are an interim solution to the water and sanitation backlog, while the municipality upgrades informal settlements into fully serviced homes.

Results of the survey shows that a high proportion of household members use communal ablution blocks to meet their water and sanitation needs. On average, households were willing to pay R112.13 per month for improved sanitation. This willingness provides opportunities for exploring innovative ways of enteringthe WATSAN market. The project was funded by Unilever and supported by eThekwini Water and Sanitation.

***Mini Hydropower*:** The municipality intends to install between two and four mini turbines fed by the city's Northern Aqueduct water distribution system. The aqueduct supplies water from the large Durban Heights treatment works to the city's northern suburbs. Due to the differences in elevation between Durban Heights and the reservoirs, there is excess pressure at the inlets to the reservoirs which is currently dissipated by pressure reducing valves. The proposed turbines will use this pressure to generate electricity, which will be fed into the municipal low tension grid. The expected output of the turbines ranges from 120 kW to 180 kW.

The project, in conjunction with the Water Research Commission, will consist of a feasibility study phase, a construction phase and a three month operation and training phase.

To view an exclusive interview with Neil Macleod at the 2nd Faecal Sludge Management Conference held in Durban last here, Visit: http://youtu.be/jdClYuSXebw ❑

NEIL MACLEOD IN A NUTSHELL

Likes

I like to be with people that are enthusiastic, passionate and have integrity. On a personal level I enjoy golf, photography and model railways.

Dislikes

Dishonesty, bad time-keeping (i.e. people that don't keep time).
Any type of cruelty or abuse to humans or animals.

Vision

My purpose in life is to make a difference in the lives of others people. Creating opportunities for people to grow and develop and achieve something in their own right. To make the world a better place.

Describe yourself in a couple of words

Conservative, impatient, demanding of others people and myself.