EDSP

ENGINEERING

WSE

About Us

EDS Projects Engineering (Pty) Ltd in association with WSE Design Works (Pty) Ltd have been extensively involved in supply of goods and services to the Department of Social Development for a number of years. EDS Projects Engineering (Pty) Ltd was created to focus on engineering development solutions for the upliftment of living conditions across the nation.

Our Vision

To become the leading solution provider in the water infrastructure / waste water treatment sector through sound and professional project management and utilisation of qualified and accredited resources and environmentally sustainable technologies.

Mission Statement

With over 80 years of combined experience in the water infrastructure / waste water treatment sector we are able to provide a complete solution to Municipalities and stakeholders from inception to hand over. We see our role to uplift the living standards of all citizens through efficient and creative solutions in the water sector. Wherever possible we will create job opportunities in the local communities we service.

Our Expertise

Our expertise in the water sector includes waste water treatment, dam and river rehabilitation, borehole projects, water treatment, water reticulation and infrastructure development.

Example of Technology

- Our waste water treatment technology uses a natural oxidation ponding system that is very cost effective to build, operate and maintain.
- The system is gravity operated wherever possible through simple settlement tanks, bio-filtration/oxygenation and final treatment ponding utilising highly effective floating Vetiver wetland plants which absorb high quantities of nitrates and phosphates.
- This non-mechanised method for waste water treatment has many advantages including reduced capital costs, operating and maintenance costs and does not require highly qualified engineers/technicians for operating the plant successfully.
- Dramatically reduced power consumption due to the non-mechanised nature is the reason why these natural solutions are being adopted globally.

EDSP is able to provide small to medium scale treatment plants that can be located within the community vicinity.

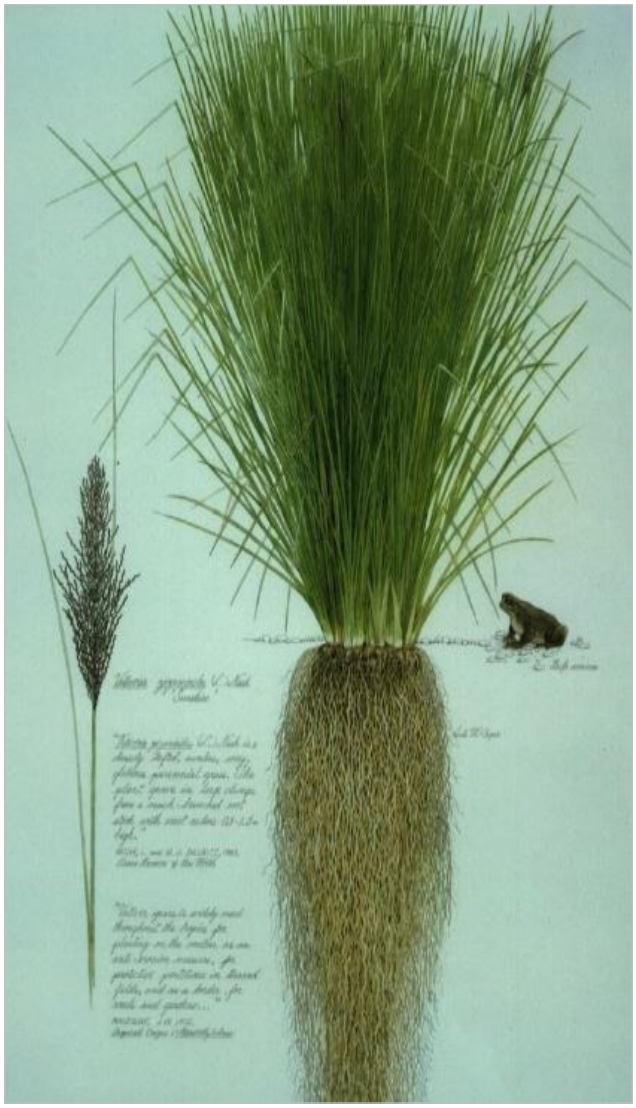
Advantages include

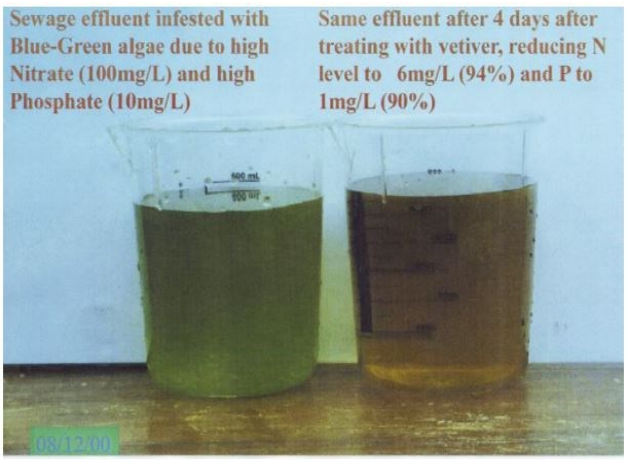
- Avoid expensive and problematic pumping stations.
- Decreased sewer network requirements with uncomplicated gravity sewer network.
- Avoid overloading existing treatment plants that are currently over capacity.
- Treated waste water can be used for agriculture and fish farming
- Simpler and more cost-effective O & M requirements versus the mega-treatment plants.
- Efficient Biological treatment operations compared to current complicated and expensive mechanical systems
- Less complex management requirements,
- Job creation opportunities within the community.
- Increased water opportunities within the communities i.e. sports fields & food security.
- Modular design, making future expansion simpler.
- Reduced effluent throughput making treatment simpler.
- Reduced Capital and Operation and Maintenance costs.

Offer of Services

To avoid repeating the mistakes of the past of simply re-implementing mechanised technologies, EDS Projects (Pty) Ltd needs to be appointed in any municipal Waste Water Treatment Works (WWTW's) rehabilitation and/or new build project from the outset, namely to carry out the following scope of works from start to finish as follows:

1. Assess the current WWTW's status and implement intervention measures to ensure a safer effluent discharge on a short-term basis.
2. Redesign the WWTW's to enable a natural oxidation ponding system to eradicate mechanisation as far as possible. Complete to final design stage and project costing.
3. Project Management of contractors appointed to complete the site-works as per the EDS Projects Design Specifications.
4. The EDS system will vastly reduce, if not eliminate the current high electrical consumption of these WWTW's entirely. The aim is to operate the EDS WWTW's system off-the-grid entirely. This will be made possible by utilising PV Solar generated power to provide the reduced power requirements, where applicable. This will enable huge savings on electrical demand and costs.
5. EDS Projects proposes that these projects are carried out on a Build, Operate, Maintain and Transfer (BOMT) basis, to ensure proper training and handover.
6. The extended handover / maintenance period is also required to implement and manage collaborative revenue generation opportunities / projects for local organisations from the use of the floating wetlands on the polishing ponds. These plants are able to be harvested and the by-products carry a financial value.





VETIVER HISTORY

GENERAL

- Developed by the World Bank for soil and water conservation in the 1980's,
- The Vetiver Grass (Vetiveria zizanioides) Chrysopogon zizanioides is sterile, non-invasive, it flowers but sets no seeds,
- Projects implemented in: Ghana, Benin, Guinea, DR Congo, Malawi, Mozambique, South Africa, Swaziland, Tanzania, Uganda, Madagascar, Kenya and Jamaica.
- High Biomass production up to 132t/ha.

PHYSIOLOGIAL CHARACTERISTICS

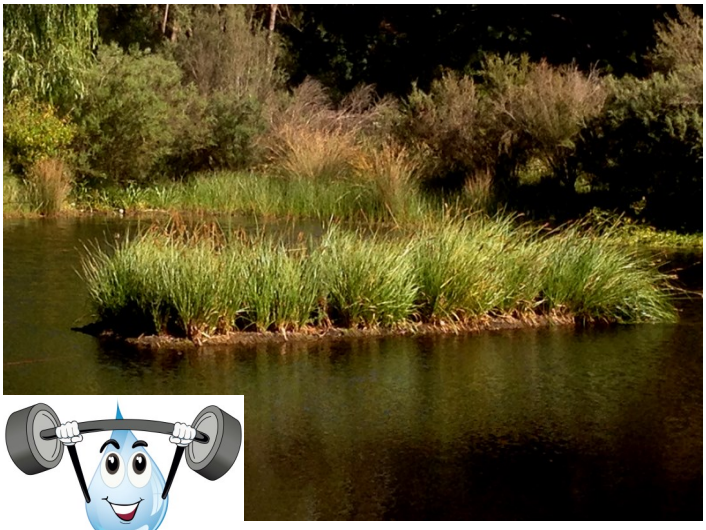
- Tolerant to adverse soil conditions,
- High acidity, pH 3.0-12.5,
- Aluminium and Manganese toxicities.

ENVIRONMENTAL CONSIDERATIONS

- Phyto-remediation - (Absorption of Heavy Metals),
- Waste Water Pollution Control - (Absorption of Nitrates, Phosphates),
- Pest Management - (Research by North West University),
- Cattle Feed,
- Arts & Crafts,
- Bio-Ethanol Feedstock,
- Vetiver Nursery – Plant Propagation & Sales.

Each Hectare of Vetiver Grass can produce up to 100 tons of Bio-Mass per harvest.

Due to the rapid growth of Vetiver in effluent water, harvesting can be carried out on average three times per annum.



CONFIRMATION OF WATER TREATMENT TECHNOLOGY

EDS Projects (Pty) Ltd in association with WSE Design Works (Pty) Ltd have for many years been advocating the use of natural "Off-the-Grid" oxidation ponding wastewater treatment systems. This approach has however been ignored over the years due to the alignment of the Consulting Engineering fraternity with mechanised wastewater technology.

An article published in the Saturday Star on 14th February 2015 quotes the Water Research Commission as follows:

"There's a lot of wastage at the moment. It's time to make our cities a lot more water sensitive because it saves water. There is a lot more money because you're not doing unnecessary wastewater treatment and it will save a hell of a lot of electricity because you need that much less to be able to treat the water we need."

"Water-sensitive cities, must organise themselves to be smart around the way they use water, treat water and move water into the system, to become water-collecting platforms."

"Cities are interested in this because their infrastructure costs are enormously high. If they continue in the way they are, water quality will deteriorate even more by the day. **Our reality is very stark. We're in a difficult climatic environment, climate change is affecting us adversely, we have expanding municipalities that require more services, our wastewater works are at breaking point."**

Water research aims to stop SA going down drain

SHEREE BEGA

IF THERE'S anything Gauteng's municipal authorities must learn from the recent severe water shortages, it's that its cities of the not-too-distant future must be resilient, adaptable to change and sustainable.

And they must be places where their people want to live.

That's the vision of the Water Research Commission and the University of Cape Town (UCT), who are working with municipalities to develop a framework to implement water-sensitive urban design.

"There's a lot of wastage at the moment," says Dhesigan Naidoo, chief executive of the Water Research Commission.

"It's time to make our cities a lot more water-sensitive because it saves water. There is a lot more money because you're not doing unnecessary wastewater treatment and it will save a hell of a lot of electricity because you need that much less to be able to treat the water we need.

"This is something all towns and cities can do."

This week, the Water Research Commission launched its water-sensitive urban design framework and sustainable urban drainage guidelines at a panel discussion in Sandton.

Water-sensitive cities, says Naidoo, must organise themselves to be smart around the way they use water, treat water and move water into the system – to become water-collecting platforms.

"Cities are interested in this because their infrastructure costs are enormously high. If they continue in the way they are, water quality will deteriorate even more by the day.

"Our reality is very stark. We're in a difficult climactic environment, climate change is affecting us adversely, we have expanding municipalities that require more services, our wastewater works are at breaking point."

WATER STRESS: A young girl imitates her mother and friend as they make their way home. PICTURE: PABALLO THEKISO

Two researchers, Kirsty Carden and Lloyd Fisher-Jeffes, from UCT's urban water management research unit, have pointed out how municipalities commonly struggle to meet the water demands of their residents.

Noting that Gauteng's water crisis in September was short-term, they said this was a "serious warning of what is to come" should the country ignore the numerous signs pointing to an impending water crisis.

The plan is to strengthen research approaches that integrate land and water planning into urban design.

Naidoo said: "Take an area like Mary Fitzgerald Square in the Joburg central business district. If you had the right kind of engineering, it would be a fantastic for rainwater harvesting. It's a wonderfully large area – you could have porous paving that allows water to go into an underground system, for example."

Water-sensitive design allows for the separation of potable water.

"We tend to use water of drinking quality for everything we do – washing cars, watering our gardens, for industrial and commercial purposes – and this is hugely wasteful. We should be using partially treated water for this.

"It (would save) a huge amount (in) treatment costs. The way we collect waste water, even partially collected water, it goes with sewage into wastewater treatment plants and... exhausts them."

A problem that could dwarf load shedding

WITHIN a decade, South Africa's water crisis could outstrip the unfolding electricity crisis, according to a recently released paper, *Parched Prospects: The Emerging Water Crisis in SA*, by the Institute for Security Studies.

It finds that South Africans use 235 litres of water a day, while the international average is 173 litres. This heavy water usage is pushing the country into a water crisis.

The report was completed in September last year, but released last month.

It singles out high use, the abuse of water resources, and the failure to plug leaks, as the leading culprits that could send the country into crisis.

The report finds that South Africa is over-exploiting its fast-deteriorating freshwater resources, and that water "could be a large constraint" on the implementation of the National Development Plan.

This over-exploitation will make the country more vulnerable to drought, which will be worsened, the study concludes, by climate change.

And, as the gap between supply and demand widens, the solutions proposed by the Department of Water Affairs and Sanitation will not alleviate the shortages without more "aggressive" measures.

– *Sheree Bega*

The following figure depicts the Park's approach to risk abatement:

W.A.S.P
WORKING AND SUSTAINABLE PROJECTS FOR GOVERNMENT AND PRIVATE SECTOR

The ponds are a favourite gathering spot for marabou storks and Egyptian geese. The water that exits the reed bed is crystal clear. There is no smell or other evidence that this serene spot is actually treating between 240 000 and 320 000 litres of sewage per day.

The Kruger National Park receives approximately 1.5 million tourists per year (plus-minus 4000 per day) and it has 2200 permanent staff. The Park owns and operates a total of 13 wastewater treatment plants with a design capacity of approximately 1000 kilolitres per day or 365 million litres per year.

The primary objective of wastewater treatment is to ensure that the treated effluent discharged to the environment does not pose unacceptable risks to human health and the ecosystem.

Oxidation pond systems are the technology of choice and preference. Over the years, the Park's engineers and operators have refined critical success factors in the design, operation and management of pond systems. This lesson will explore some of these success factors and the critical elements that convinced the Park that pond systems are more appropriate and sustainable for their specific needs than alternative treatment options.

2 The significance of a double Green for a national park

KNP is a national asset that South Africans can be proud of. It is an internationally renowned game park – one of the biggest in the world with an exclusive variety of African wildlife. This puts the Park in the international spotlight.

When SANParks, and KNP in particular, give presentations at international wildlife conferences, the SANParks' Board is expected to report that operations in the Park are green and ecologically sustainable. Tourists are also increasingly aware of green[1] technologies and demand green environmental management.

Oxidation pond systems offer such a green solution to wastewater management.

International tourists demand excellent service. The average tourist has a low tolerance furthermore for inefficiency or pollution of natural resources:

The Kruger National Park was established in 1898 to protect the wildlife of the South African Lowveld. This

5.1 Why Ponds?

In response to the question: **"Why ponds?"** the senior engineer said the following:

> *Kruger must use green technology. Oxidation ponds offer a green solution for wastewater treatment.*
>
> *The life cycle costs and the large carbon footprint of activated sludge plants render this technology unsuitable and inappropriate for the Kruger National Park.*
>
> *Although the Park still uses diesel pumps, their medium term planning is to convert all diesel power to solar power and thereby reduce the residual carbon footprint even further.*
>
> *KNP generates relative small quantities of uncomplicated, low strength wastewater. The oxidation pond systems offer the most cost effective solution to treat this type of wastewater. The warm climate of the Park is also conducive to the effective functioning of oxidation pond systems.*
>
> *The Park covers 19,485 km², which is a huge area. Each small wastewater treatment plant at each rest camp or picnic spot must function independently and efficiently to meet tourists' expectations and the national regulator's compliance requirements. Oxidation pond systems are ideal for this kind of scenario, where high quality standards must be sustained with a small staff contingent over a large geographic area.*
>
> *Why oxidation ponds and not evaporation ponds? Again the greening of operations was the key consideration. Since we use water from the rivers flowing through the Park, we have to put water back into the system.*
>
> *Oxidation ponds and reed beds offer added value to our tourists. For example, at the Tamboti camp there is a bird hide at the reed bed.*

7 Pond systems as appropriate technology for municipalities

> *Many people say it is impossible to clean wastewater with oxidation ponds to the required legal standard. We say it is a piece of cake. A technology is as good as the people who operate it. (Blake Schraader)*

Pond systems are cheaper than activated sludge systems and easier to maintain. Ponds require staff of a lower technical skills level than activated sludge systems, and no operators are required full time on site to operate the plants.

But can you treat complex wastewater in an oxidation pond system?

Most constructed wetlands around the world are still mainly used to treat municipal wastewater, but in the past few years, it has become more common to treat industrial and agricultural wastewater, stormwater runoff and landfill leachate in pond systems and artificial wetlands.

> *Despite the mistrust of many civil engineers and water authorities, constructed wetlands have been widely accepted around the world and have become a suitable and appropriate solution for wastewater treatment.²*

Unfortunately, knowledge of ponds is limited in South Africa. Many municipal wastewater managers do not understand the technology and hence feel uncomfortable to take decisions in this regard.

EDS PROJECTS HAS BEEN RUNNING AND ADVOCATING THIS TECHNOLOGY SINCE 2006 TO NO AVAIL— HOWEVER NOW THE WATER RESEARCH COMMISSION IN ASSOCIATION WITH UCT CAN NOW CONFIRM THE MERITS OF NATURAL OXIDATION PONDING TECHNOLOGY.

COMMUNITY ECONOMIC OPPORTUNITIES USING NATURAL OXIDATION PONDING WASTEWATER TREATMENT TO CREATE A WATER ASSET PLATFORM

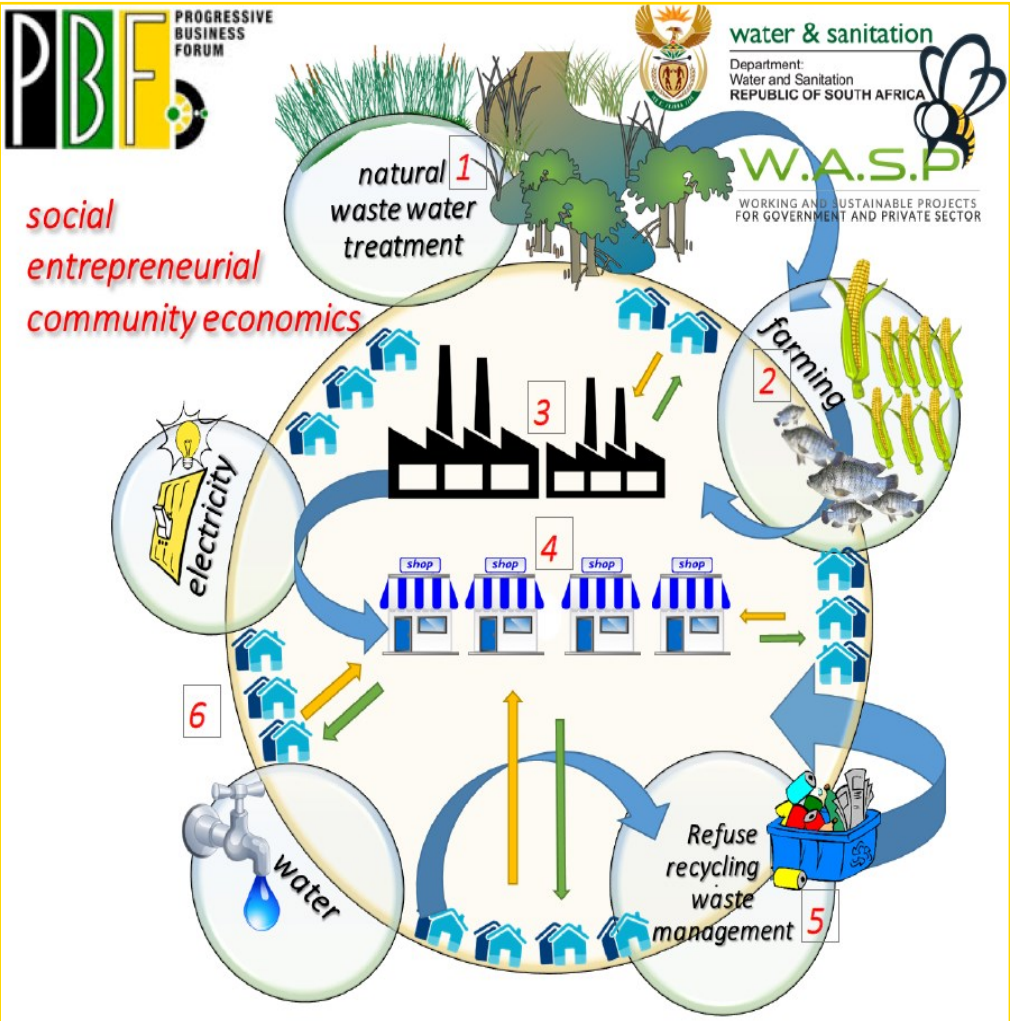
INTRODUCTION:

Traditionally infrastructure services such as wastewater treatment is situated away from any community and it is therefore not viable to utilize the treated discharge for secondary opportunities within the originating community.

However with the adoption of Natural Oxidation Ponding and floating Vetiver Wetland Wastewater treatment, wastewater treatment works can now be situated within the community vicinity and the quality water discharge will create a water asset, which can be used as the platform for creating community economic opportunities and activities.

The reliable nature of the oxidation ponding treatment system guarantees a quality water discharge that can safely be used for secondary purposes such as irrigation for farming projects, amongst others.

The schematic below demonstrates the revenue generating opportunities that are possible within a community by using water as an economic platform.



1. OXIDATION PONDING
   - Local Job Opportunities- Managing the treatment works.
   - Vetiver harvesting.
   - Plant Propagation and resale.
   - Treated water allocated to secondary opportunities.
2. FARMING PROJECTS
   - Tunnel farming & hydroponics.
   - Greenhouse water harvesting.
   - Fish farming.
3. FOOD PROCESSING
4. RETAIL OF LOCAL PRODUCTS
5. LOCAL WASTE MANAGEMENT
6. HOUSEHOLD SPEND IN THE COMMUNITY / REVENUE GENERATION

ECONOMIC BENEFITS AND SAVINGS:

- REDUCED ELECTRICAL COST DUE TO "OFF-THE-GRID" NATURAL OXIDATION PONDING TREATMENT WORKS.
- REDUCED WATER COST DUE TO RE-USE FOR SECONDARY PURPOSES.
- COMMUNITY JOB CREATION AND OWNERSHIP OPPORTUNITIES.
- SUSTAINABLE REVENUE GENERATION AND CIRCULATION IN THE COMMUNITY.