eThekwini Municipality Alternative Sanitation Approaches

Gates Foundation Alternative Sanitation Approaches Learning Session




01 | Background

Background

Overview of eThekwini Municipality

Area of the City's coverage is approximately 2 555 km^2

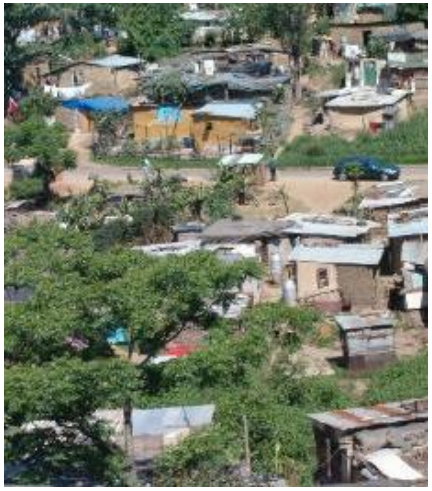
The City's boundary are approximately 100 km North to South and 70 km East to West

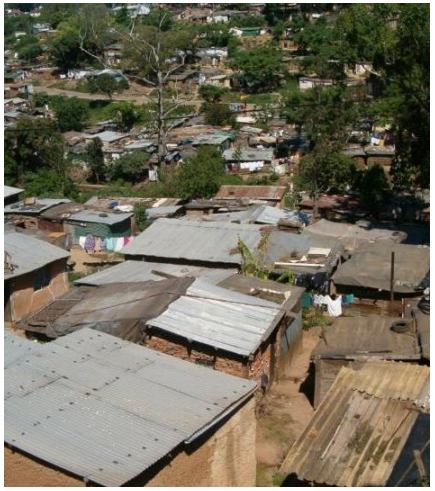
The City development is 55% Urban and 45% Rural

The official population stands at ± 4.2 million

eThekwini is the economical hub of KwaZulu-Natal

Background





Informal settlements in eThekwini

Over 603 urban informal settlements

25% of the City's population

Urbanization and scarcity of well-located land

80 years forecasted to overcome the backlog by means of conventional housing delivery

Challenging topography, high densities, dwellings in environmentally sensitive areas

Many are very dense (>200 per hectare)

<3% of households earmarked for relocation

41% of land privately owned (18% city-owned)

Background

Severe flooding across eThekwini Municipality and the impact:

- 8th to 11th April 2022, approximately 450mm rainfall recorded across the City
- Storm classified as a level 9 warning
- Disruptive rainfall resulted in severe damage to:
  - Homes
  - Sanitation and water infrastructure
  - Stormwater infrastructure
  - Retaining walls
- A death toll of 438 persons
- eThekwini recognised as having high exposure to severe flooding events (2017, 2019, 2022)
- Informal settlements constitute an ongoing situation of emergency highly susceptible to flooding

Background

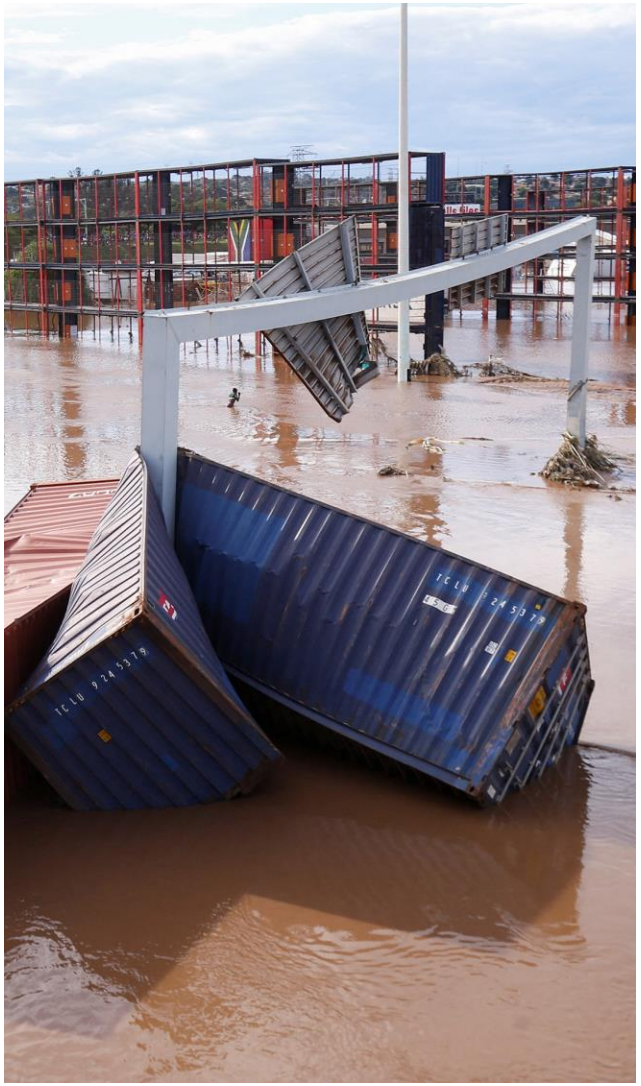
Teachable moment for climate adaptation and risks

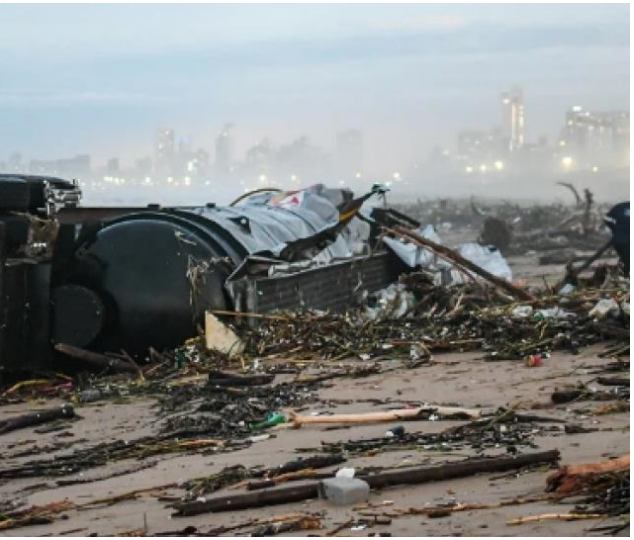
Over 12 000 homes completely destroyed

Millions worth of infrastructure damaged

Sanitation services restoration lag behind

Background





02 | Technology and Site Selection

Site Selection

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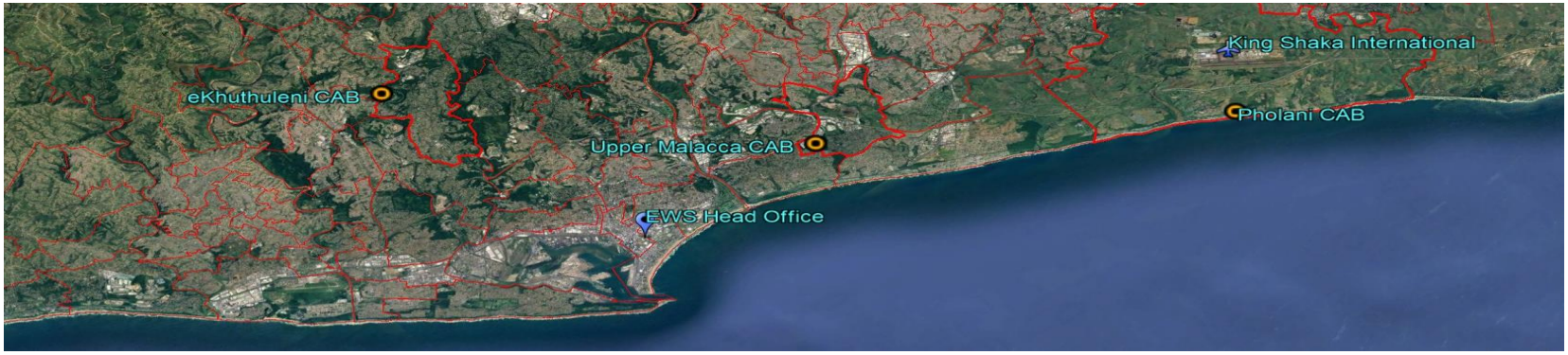


Chiltern RD - Shallcross

CAB: 1 x Female and 1 x Male

Lower density (± 100 dwellings)

Malacca Road - 2 Sites

CAB: 2 x Female and 2 x Male

Lower density (± 100 dwellings)

Pholani – La Mercy

CAB: 2 x Female and 2 x Male

High density (± 200 dwellings)

Technology Selection

1

Innovation needed to be:

- environmentally and financially sustainable,
- higher level of user acceptance
- Address sanitation backlog

2

New Sanitation technology was to:

- reduce water consumption
- Reduce environmental impact
- Improve health and hygiene
- Acceptable to users

3

Non-sewered Sanitation methodology selected due to non-sustainable water-borne sanitation methodology (Durban terrain and increasing population density).

4

Durban in 2017 became epicenter for Non-sewered Sanitation technology testing (Engineering Field Testing Program – EFTP), where 19 prototypes were tested at 20 sites (householder, schools, community).

5

Pilot will provide a confident suit of Non-sewered Sanitation technologies (based on pilot outcome assessment) which can assist in the reduction of the sanitation backlog

Technology Selection

Technology One: Clear

- Local Technology Provider: Enviro Options
- 100% recycling of effluent for flushing
- Solar panel (can operate off grid)
- Plant: Aerobic reactor, membrane biological rector and ozone disinfection

Technology Selection

Technology Two: New Generator

Local Technology Provider: WEC Projects

100% recycling of effluent for flushing

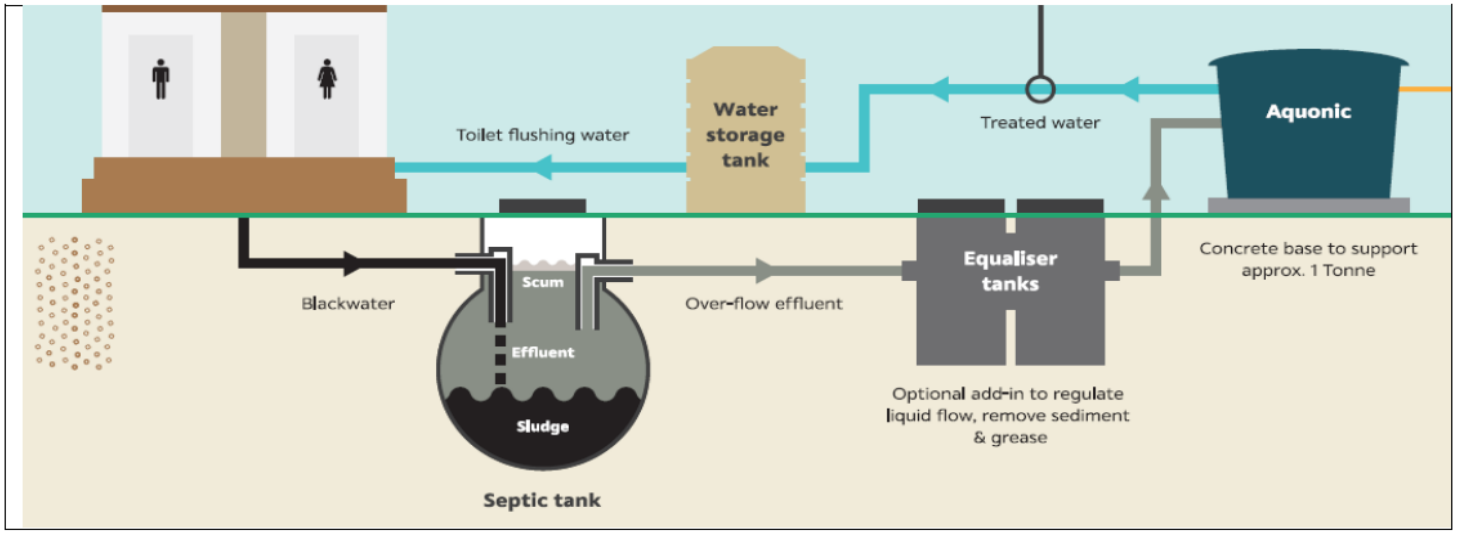
Greywater treatment for re-use

Solar panel (can operate off grid)

Plant: Filtration membrane and media, biogas digester and hydraulic components

Technology Selection

Technology Three: Aquonic



- Local Technology Provider: Prana
- 100% recycling of effluent for flushing
- Greywater treatment for re-use
- Plant: Holding tank, equaliser tanks, filter media and bio media

03 | Challenges, Highlights, Lessons

Challenges, Highlights, Lessons

Challenges	Existing informal settlements with CABs	New informal settlements

• Existing informal settlements with CABs
  • Strained sewer network
  • Wastewater incidents overflowing to environment
  • Health, Safety and Environmental risks
• New informal settlements
  • Site constraints - protected parcel
  • Wastewater treatment works with limited capacity
  • Informal sanitation practices
	• 4 sites identified for Non Sewered Sanitation systems based on selection criteria – closed looped system, can be utilised within protect parcels
	• Positive political and community engagement allowing project to proceed
	• Installation of technologies in progress
	• Local job creation
	• Projects on track to be operational in November and December 2024
		• Early engagement with communities and leadership structures builds trust and ownership
		• Social assessments provide insight into community sanitation status quo and attitudes to services
		• Space for the systems to be installed adjacent to front end (toilet blocks) is essential

Challenges, Highlights, Lessons

04 | Change in Methodology

Change in Methodology

Early stage of project thus methodology changes will be documented during the next 12 months

Methodology change will be required for green fields sites

Dedicated front end for toilets will be investigated	Dedicated washing facility will be investigated for sites where grey water can be managed

05 | Return on Investment

Return on Investment

Evaluation of Technology Impact

Evaluation will include:

- Documentation of Capital expenditure
- Operational maintenance requirements and cost
- Comparison to other sanitation options
- System evaluation (30500 compliance)
- Social evaluation

Based on findings, return on investment calculation will be undertaken

Will guide future rollout of innovative technologies

Improved service delivery & response times - revenue recovery improvement

The End

Questions