



KHANYISA PROJECTS CASE STUDY

OPS APP

AT A GLANCE

FUNDERS

The project was funded by Technology Innovation Agency (TIA) through its Rapid response fund.

TIMELINE

2020 - 2021 with an expanded project starting in 2022.

AREAS

Non-revenue water & asset management initiatives in various suburbs & informal settlements in eThekweni Municipality (Durban) & to be rolled out in other municipalities in 2022.

"Khanyisa Projects provided a service of high quality and we would recommend them for any similar work"

NEDON RAMSURAN

EThekweni Water and Sanitation

OBJECTIVES

Why: The Ops App was developed to address Water loss and other Asset management challenges within Municipal Water and Sanitation departments.

What: The project involved the development of a mobile App and data management system for the efficient management of municipal programmes.

How: The Ops App uses smart phones to capture information on the ground and a data management system where automated reporting and real time visualisation of data can be generated and monitored by managers in order to make informed, urgent and long term decisions.

KEY INITIATIVES

- The "War on Leaks" household water loss reduction programme
- The Communal Ablution Block faults and asset management programme
- The water restriction project for households with high water consumption
- Meter and meter fault detection
- The App system allows for the recording of bulk meter readings, fault identification, repairs, customer satisfaction and management and verification of fault repairs. The App was trialled in a number of project areas in partnership with the eThekweni Water and Sanitation Department



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KEY ACHIEVEMENTS

- The water manager is able to review water balance improvements and asset management hot spots through automated reports
- Support was received for the programme from City Management
- A commitment of R10 million per year was made by the municipality towards their leak repair programme
- The Ops App received approval as an official App of the eThekweni Municipality
- Additional funding has been approved by the TIA to expand the App within eThekweni and target other municipalities within the Country with various adapted versions

BACKGROUND

South Africa is not a water rich country and yet we lose a substantial amount of treated water (unaccounted for water) through leaking pipes, inadequate infrastructure, database weaknesses and poor systems and controls.

Khanyisa Projects was motivated to submit a data management proposal to the Technology Innovation Agency (TIA) in order to assist municipalities to become more resilient through sustainable management of resources as well as sound financial and infrastructure management. Municipalities need to utilise new digital technologies to secure their future.

Some of the on the ground problems facing municipal water and sanitation departments are set out in the table below.

Non-Revenue Water (NRW)	Sewer Operations	River Catchment/pollution/Sewer Networks	Water (and Sanitation) Construction
<ul style="list-style-type: none"> - High Domestic water loss - Non-payment - Meters not installed of on billing system - No recovery – zonal water consumed 	<ul style="list-style-type: none"> - Ablution Blocks - Blockages - Overflowing manholes - Pump station faults 	<ul style="list-style-type: none"> - Sewer blockages/leaks - Pump station faults (river pollution) - Assigning of pollution to different departments etc. <ul style="list-style-type: none"> o Sewer operations o Pollution o Solid waste - Alien species (rivers) 	<ul style="list-style-type: none"> - Poor data with regard to customers and meters in some cases - Water reticulation programmes (manual recording) - Meter installation programmes (manual recording)



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KEY OBJECTIVE

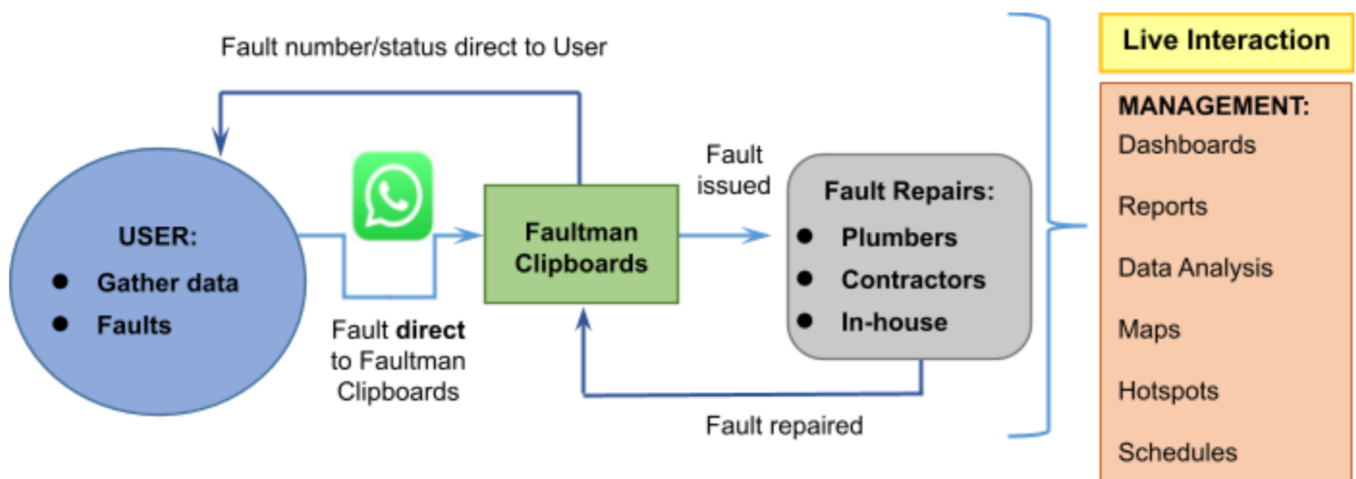
The objective of the project was to develop an App and data management system to assist with water loss and asset management activities through improved data collection, analysis and reporting as well as efficient deployment of repair teams and accountability for work undertaken. The project also aimed to test the new system in the field in order to reach a Technology Readiness Level (TRL) of 6.

Fundamental Approach:

- The App was developed on the Open Data Kit (ODK) system which is freely available to anyone and allows for rapid modification where required
- The App was developed with municipal management teams and field staff so that it met the real needs of the field teams and managers (i.e. not a top down approach to the development)
- The App integrates with existing municipal tools and products i.e. it is not a standalone product
- The operational tools and apps can be adapted to the individual needs of different departments and different municipalities

DESCRIPTION

The simple diagram below illustrates the manner in which the App and database system integrates within the existing eThekweni Municipality Water and Sanitation department





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PROCESS STEPS

The key project steps included the following:

- Development
 - Set up and configuration of cloud based aggregate sever
 - Development of mobile electronic data collection forms (Apps)
 - Deployment of Apps to the aggregate server
 - Installing of ODK adapted system onto mobile devices
 - Development of data extension tools and automated reporting
- Testing in the field
- Monitoring of test phase and collection of user information
- Modification of App system
- Final testing

BUSINESS BENEFITS

- Non-Revenue Water (NRW) Benefits

Through the efficient implementation of the “War on Leaks” programme to reduce household and mainline leaks; significant zonal water savings were recorded. The use of the App in the monitoring of System Input Volumes (SIVs) through the regular recording of bulk meters for zones provides details of these savings.
- Data Cleansing

Data cleansing through the installation of new meters, capturing of new customers for new meters and meters on the ground that are not in billing together with the implementation of programmes such as restriction of residential flow are greatly enhanced through the use of the App to capture data and produce required reports. This will in turn enhance revenue collection. The App will thus assist the NRW team to address both physical and commercial losses. In addition, the App will provide understanding of trends and practises within the CABs, and guide planning to reduce water loss, and address faults timeously.
- River Catchment Health (Environmental)

This aspect of the App allows for a co-ordinated focus on various cases of poor river health including industrial pollution, sewer leakages, illegal dumping and alien vegetation growth. The App allows for rapid response to problems as well as the generation of reports to identify pollution hotspots, response times and resolution status. Improved health of rivers results in the following benefits:
- Other Improvements:
 - Community health particularly within poor communities living close to rivers
 - Health and status of public areas such as river eco-systems and beaches
 - Cost of clean ups and reduced negative effect on tourism areas
 - Quality of life (QOL) for communities using natural areas in the municipality



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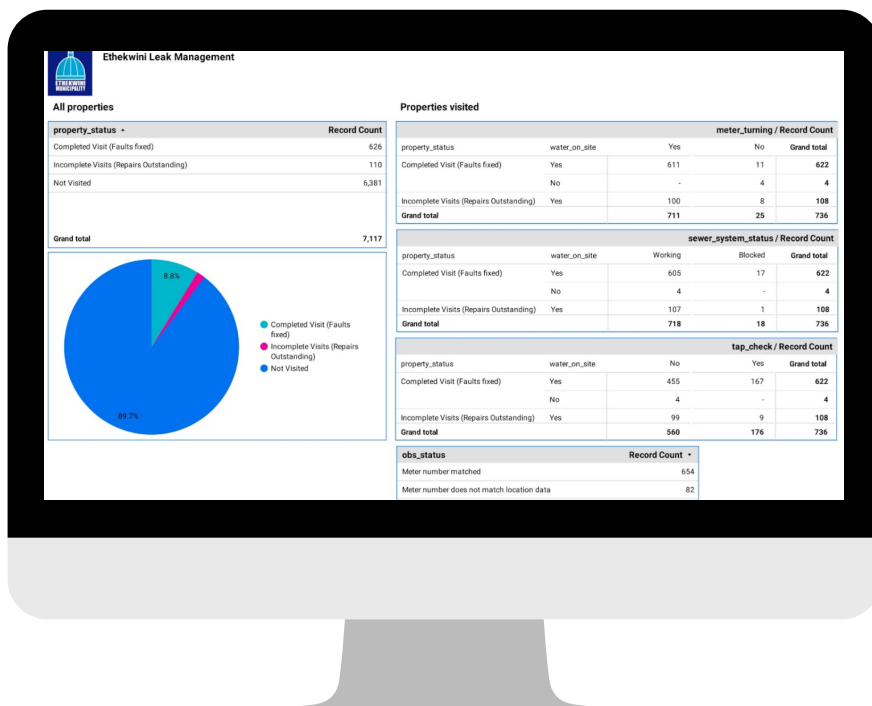
GENERAL BENEFITS

- The use of open source software allows for rapid adjustments of the App for improved data management or new focus areas such as a debt management plan or an illegal connection detection programme
- Customised database and reports can assist managers to close the loop of fault repairs and to provide a portfolio of evidence; allowing for virtual life cycle monitoring and generation of hot spots will assist management with long term planning
- The system is cloud based allowing unlimited scalability, the system can be transferred to an in-house data system if required
- Live data can be viewed in different formats through a web based platform

APP SCREENSHOTS

The visuals below illustrate the following:

- Examples of Capture Forms
- Data in the form of dashboards and tables
- Data shown visually on maps





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1a Household Assessment

- Fields include**
- Water loss meter check
 - Checklist
 - GPS location of home address
 - Pictures and GPS location

1b Consent

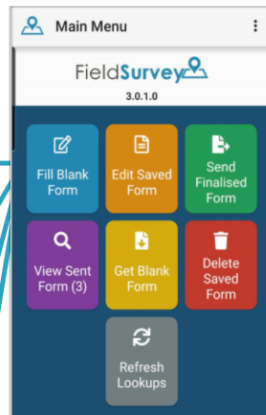
- Consent document with approved faults
- Customer signature
- GPS location

1c Fault Reporting

- Trainee plumber fixes faults:**
- List of spares used
 - Faults outstanding
 - GPS location

1d Supervisor Inspection

- Two forms:**
- Customer satisfaction
 - Fault repairs inspected



Management reports/data can be accessed **live** and **remotely**



Tab Name	Description
Dashboards	Customized reports
Map	Location of all data
Data	Individual details including pictures
Data Update	A view of all data in a table format
Reports	Reports showing statistics and graphs
Documents	Upload <u>hardcopy</u> documents



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Layers
 eThekweni_Regions

condition
● [Good] ● [No_Access] ● [Operational] ● [Poor] ●

Details

zone	West
ward	Ward 92
cab_number	TM1422M:TM1423
meter_no	CPK759
water_on_site	Yes
condition	Operational
cab_status	CAB with Meter
male_cab_number	TM1422M
female_cab_number	TM1423
male_condition	Operational
female_condition	Operational
state_what_is_urgent_male	
state_what_is_urgent_female	

Filters

Date Range: Start date: [] End date: []

filter_all: EWS Water Meter

meter_no: CCF661

Details

zones	South
wards	99
water_onsite	Yes
meter_onsite	Yes
meter_type	Domestic
meter_no	CCF661
meter_reading	6338
meter_operational	Yes
status_condition	Good
others	
formid	ews_water_meter_identification
filter_all	EWS Water Meter
record_id	uuid:37304446-2523-46c6-ae8c-701296720bcf
submission_date	2021-10-07
longitude	30.7719433333
latitude	-30.21491
address	37 Hillary Rd, Naldooville, Craipeburn, 4170, South Africa

Images



✓ Meter Type	Total
<input checked="" type="checkbox"/> No Meter	94
<input checked="" type="checkbox"/> Domestic	213
<input checked="" type="checkbox"/> Bulk	22

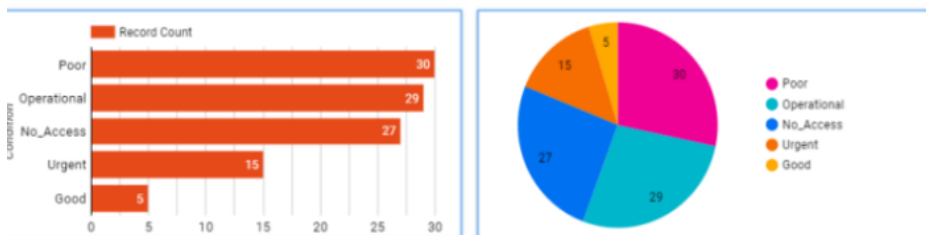
✓ Condition	Total
<input checked="" type="checkbox"/> Others	87
<input checked="" type="checkbox"/> None	35
<input checked="" type="checkbox"/> Damaged	4
<input checked="" type="checkbox"/> Buried	1



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CAB Condition



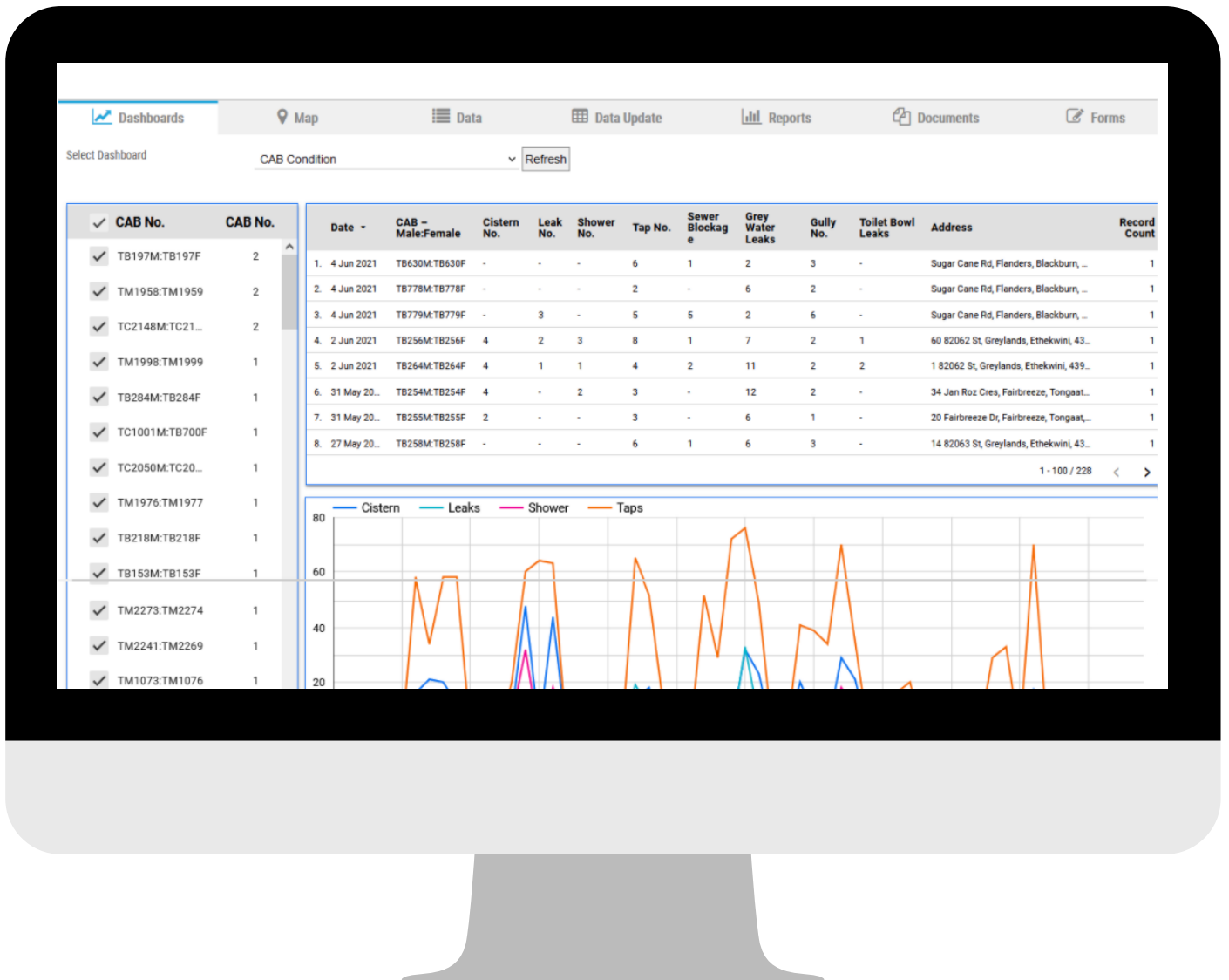
eThekweni Water and Sanitation CAB Status Report

CAB Details		Female CAB No.: TBNO02F	Male CAB No.: TBNO02M
Zone:	North		
Ward:	Ward 57		
CAB No.:	TBNO02M:TBNO02F		
Meter No.:	CKA274		
Water On Site:	Yes		
Female CAB Condition:	No_Access		
Male CAB Condition:	No_Access		
Longitude:	30.97834000		
Latitude:	-29.702453333300		
Address:	47 120557 St, Bhambayi, Inanda, 4310, South Africa		
CAB Assessment (Faults)			
Cistern Qty:	0		
Leaks Qty:	2		
Shower Qty:	0		
Tap Qty:	4		
Toilet Bowl Qty:	0		
Gully Qty:	0		
Grey Water Leaks Qty:	8		
Sewer Blockage:	0		
CAB Caretaker			
Surname:	Mhlongo	Time CAB Locked:	19:00
Other Names:	Nombuso	Key Available @ Night:	No
Cell Number:	0735770517	How Many Times Keys Replaced:	0
Reside Within 200m:	Yes		
Location:	-29.7016816667_30.9780050000		



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