



The City of Cape Town Decision Support System

Introduction

From Crisis Comes Opportunity

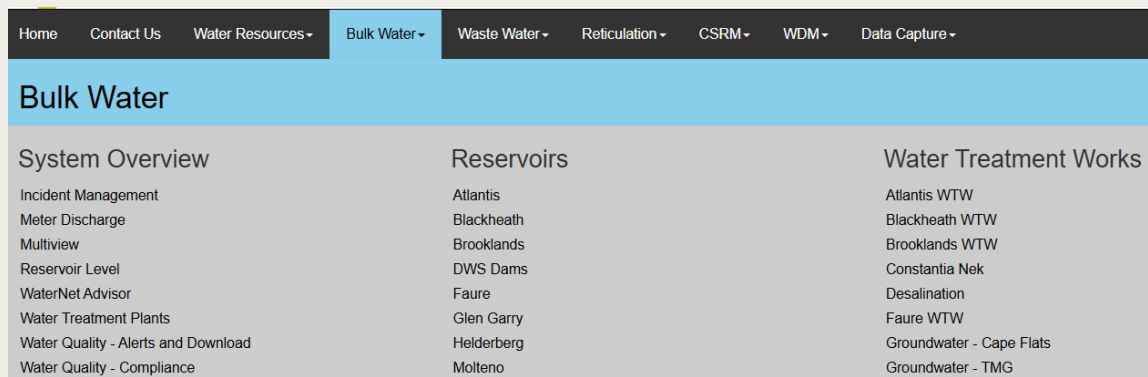
- The 2017 drought brought Cape Town dangerously close to “Day Zero” — a turning point for water management.
- The City, home to over **4 million water drinkers**, is responsible for producing and distributing ~**1,000 million litres** of water daily through a vast network of infrastructure valued at **R55 billion**.
- Managing this scale of service required a shift toward smarter, more responsive systems — and making data more accessible.
- In response, Zutari partnered with the City to co-develop a Decision Support System (DSS).
- Initially built to address the immediate crisis, the DSS has evolved into a strategic decision-making platform.
- It now plays a key role in enabling data-driven operations and driving the City’s digital transformation in Bulk Water.

Low dam levels as day zero approached.



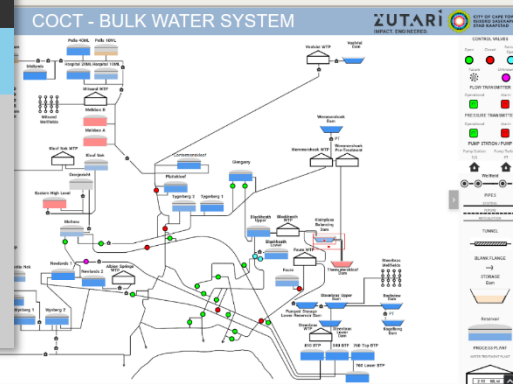
What is the DSS?

- A web-based platform designed for optimal data ingestion, handling, and insight.
- This includes the integration GIS, real-time telemetry, and manual capture data.
- Replaces paper-based processes with digital data capture, featuring built-in validation for improved accuracy and efficiency..
- SCADA and telemetry systems were re-engineered using open data architecture, avoiding vendor lock-in and future-proofing real-time data streaming from a wide variety of sites.
- Real-time operational data is now integrated into a digital water network model, allowing advanced simulations.
- Operational decisions can now be tested before implementation — making it possible to predict the impact of valve changes, contamination, or outages.



Web interface displaying data accessibility

Re-designing existing Industrial applications.



Open data real time example

MQTT Explorer

Application Edit View

MQTT Explorer Search...

- ▼ Water & Sanitation (W)
 - ▼ Bulk Water (W)
 - ▼ Strandfontein Pavillion (QSV)
 - ▼ Secondary Process (78) = {"quality": "Good", "value": 374991934, "timestamp": "2025-06-13 16:31:10"}
 - ▶ EM-02 (1 topic, 1 message)
 - ▶ P-06 (1 topic, 1 message)
 - ▶ P-11 (8 topics, 8 messages)
 - ▼ P-12
 - ▶ ANALISERS (1 topic, 1 message)
 - ▶ GENERAL (1 topic, 1 message)
 - ▶ LEVEL (1 topic, 1 message)
 - ▼ TELEMETRY
 - BACKGROUND_NOISE = {"quality": "Good", "value": 119, "timestamp": "2025-06-13 16:23:00"}
 - CHANNEL_UTILIZATION = {"quality": "Good", "value": 19, "timestamp": "2025-06-13 16:20:00"}
 - CONNECTION_TIME = {"quality": "Good", "value": 2316, "timestamp": "2025-06-13 16:04:08"}
 - SIGNAL_STRENGTH = {"quality": "Good", "value": 74, "timestamp": "2025-06-13 16:23:00"}
 - VOLTAGE_BATTERY = {"quality": "Good", "value": 13.897016525268555, "timestamp": "2025-06-13 16:28:00"}
 - VOLTAGE_SUPPLY = {"quality": "Good", "value": 25.824291229248047, "timestamp": "2025-06-13 16:28:00"}
 - ▶ P-13 (9 topics, 9 messages)
 - ▶ P-15 (9 topics, 9 messages)
 - ▼ P-16
 - ▶ ANALISERS (1 topic, 1 message)
 - ▶ GENERAL (1 topic, 1 message)
 - ▶ LEVEL (1 topic, 1 message)
 - ▶ TELEMETRY (5 topics, 5 messages)
 - ▶ P-17 (1 topic, 1 message)
 - ▶ P-60 (1 topic, 1 message)

Topic

Water & Sanitation (W) / Bulk Water (W) / Strandfontein Pavillion (QSV) / Secondary Process (78) / P-12 / TELEMETRY / SIGNAL_STRENGTH

Value

< > RETAINED X QoS: 0 06/18/2025 11:01:53 AM

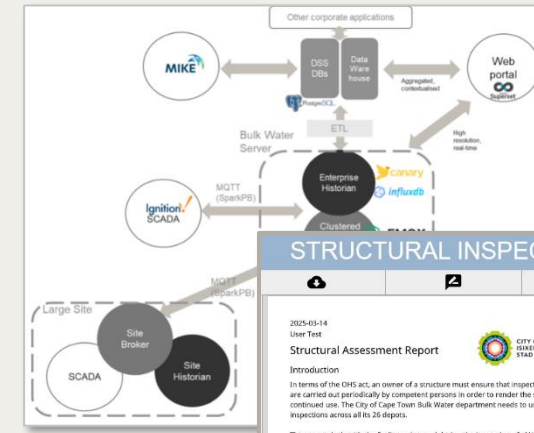
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{
  "quality": "Good",
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}
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Open Data Enables Innovation

Core Integrations

- Open Data Architecture:
 - Built on modern standards using the lightweight MQTT protocol.
 - Enables scalable, real-time data exchange aligned to a unified information model.
- Advanced Simulation with WaterNet Advisor:
 - Real-time model syncing for:
 - Hydraulic analysis
 - Flow and source tracing
 - Water quality and water age evaluation
 - Pumping scenario simulations
- Web-Based Manual Capture Platform:
 - Replaced all legacy paper systems.
 - Centralizes validated input from the field, accessible via PC or tablet.
- Mobile Apps for Infrastructure Monitoring:
 - Structural assessment and dam safety inspections are digitized.
- Operational Chatbot via WhatsApp:
 - Offers quick responses to user queries.
 - Empowers field operators with real-time insights at their fingertips.

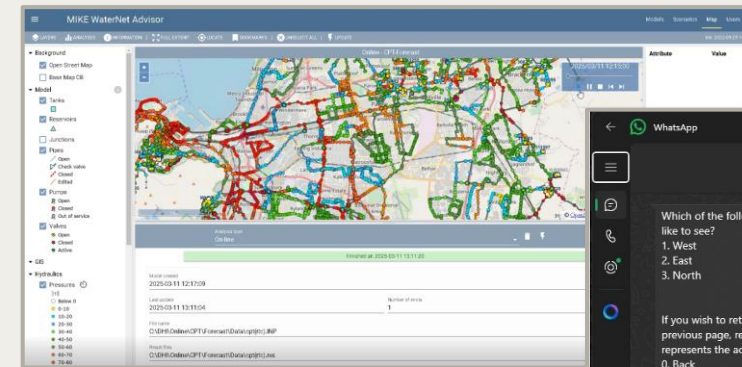
Open data architecture diagram



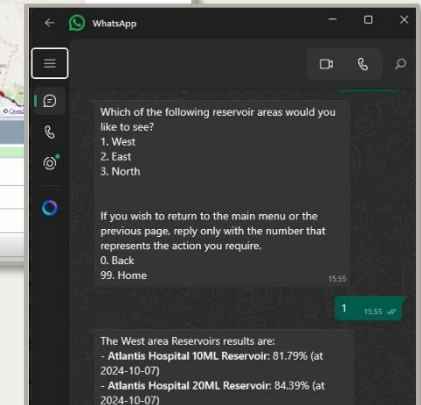
Structural assessment app



WaterNet Advisor



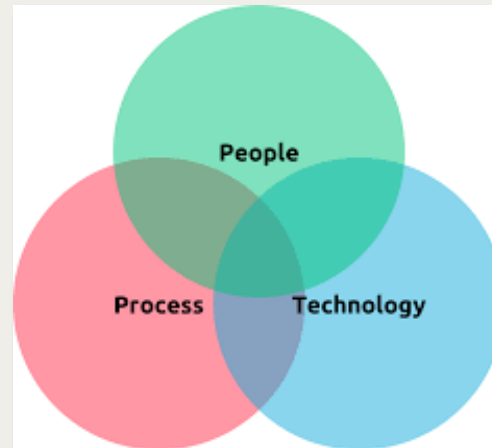
WhatsApp chat bot



► The Real transformation: A Culture shift

Technology is easy, people not so much.

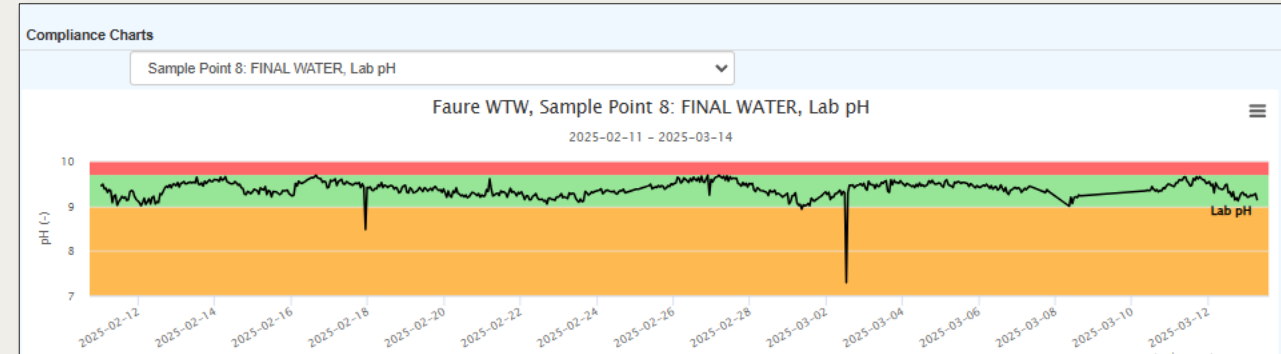
- Technology was the easy part – the real challenge was shifting mindsets and getting people to embrace new ways of working.
- A culture shift was enabled through empathy, creativity, and simplicity – with regular hands-on, on-site training that made digital tools feel accessible.
- Over 500 staff members were trained by a dedicated team.
- The DSS platform evolved based on feedback from its users, with continuous improvements to the user interface ensuring it met operational needs.
- In the end, the DSS was more than just a system – it became a transformation in how people work, collaborate, and make decisions.



From Data to Impact

Building Trust, Safety and Deeper Insights

- Open data has opened up new ways to see, understand, and respond to challenges — helping the City make smarter decisions.
- The DSS gives near real-time water quality data, helping prevent issues, respond faster to non-compliance, and build trust in the water supply.
- Network simulations let the City model events like contamination, assess risks, and improve response plans — making the system safer.
- Structural and dam safety tools enable quick, consistent reporting and long-term tracking — replacing static PDFs with live, searchable data.
- What was once hidden is now visible and actionable — helping Cape Town run a safer, more resilient water network.



Graph displaying lab data.

Home

Bulk Water

System Overview

Water Quality - Compliance

Compliance Map

Compliance Table

Start Date:2024-03-14End Date:2025-03-14

Treated (Bulk)SummaryAcute Health (Chemical)Acute Health (Micro)AestheticChronic Health (Chemical)OperationalUnassigned

Sample Point Co...	Sample Point Name	Region	Total	Combined nitrate plus nitrite	Cyanide	Nitrate	Nitrite	Sulphate
Filter on Sample Poi...	Filter on Sample Point Name	Filter on Region						
Total			1 / 6240 / 100.0%	1 / 1070 / 99.9%	0 / 999 / 100.0%	0 / 1070 / 100.0%	0 / 1072 / 100.0%	0 / 1069 / 100.0%
ATL_FNLMS05	Atlanta (Final - Melkbos)	ABSDTICHE076u	0 / 247 / 100.0%	0 / 81 / 100.0%	0 / 42 / 100.0%	0 / 81 / 100.0%	0 / 81 / 100.0%	0 / 81 / 100.0%
ATL_HOSP10	Atlanta (Hospital Reservoir 10)	ABSDTICHE076u	0 / 55 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%
ATL_HOSP20	Atlanta (Hospital Reservoir 20)	ABSDTICHE076u	0 / 89 / 100.0%	0 / 12 / 100.0%	0 / 11 / 100.0%	0 / 12 / 100.0%	0 / 12 / 100.0%	0 / 12 / 100.0%
ATL_PELLA10	Atlanta (Pella Reservoir 10)	ABSDTICHE076u	0 / 85 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%
ATL_PELLA40	Atlanta (Pella Reservoir 40)	ABSDTICHE076u	0 / 87 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 12 / 100.0%	0 / 12 / 100.0%
ATL_SSRES	Atlanta (Silverstream Reservoir)	ABSDTICHE076u	0 / 87 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 12 / 100.0%	0 / 12 / 100.0%
BH_TREATED	Blackheath WTP Treated sample	ABSDTICHE056u	0 / 488 / 100.0%	0 / 96 / 100.0%	0 / 82 / 100.0%	0 / 96 / 100.0%	0 / 96 / 100.0%	0 / 96 / 100.0%
BL_TREATED	Browlands WTP Treated sample	ABSDTICHE056u	0 / 487 / 100.0%	0 / 98 / 100.0%	0 / 83 / 100.0%	0 / 98 / 100.0%	0 / 98 / 100.0%	0 / 98 / 100.0%
CN_TREATED	Constantia Nek WTP Treated sam	ABSDTICHE076u	0 / 15 / 100.0%	0 / 3 / 100.0%	0 / 3 / 100.0%	0 / 3 / 100.0%	0 / 3 / 100.0%	0 / 3 / 100.0%
FA_TREATED	Faure WTP Treated sample	Bulk_End	1 / 444 / 99.8%	1 / 91 / 98.8%	0 / 80 / 100.0%	0 / 91 / 100.0%	0 / 91 / 100.0%	0 / 91 / 100.0%
GPW03	Orangezicht Reservoir Outlet (DB)	ABSDTICHE076u	0 / 60 / 100.0%	0 / 12 / 100.0%	0 / 12 / 100.0%	0 / 12 / 100.0%	0 / 12 / 100.0%	0 / 12 / 100.0%
GPW04	Muleno Reservoir 840mm Outlet	ABSDTICHE076u	0 / 80 / 100.0%	0 / 10 / 100.0%	0 / 10 / 100.0%	0 / 10 / 100.0%	0 / 10 / 100.0%	0 / 10 / 100.0%
GPW05	Kloofnek Reservoir Outlet (Dietrich)	ABSDTICHE076u	0 / 55 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%
GPW07	Eastern High Level Reservoir Outl	ABSDTICHE076u	0 / 55 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%
GPW10	Muleno Reservoir 710mm Outlet	ABSDTICHE076u	0 / 80 / 100.0%	0 / 10 / 100.0%	0 / 10 / 100.0%	0 / 10 / 100.0%	0 / 10 / 100.0%	0 / 10 / 100.0%
HBW07	Faure Reservoir (Distribution Total)	Bulk_East	0 / 55 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%	0 / 11 / 100.0%

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Compliance table. As you can see everything is green i.e. Don't buy that bottled water.

In Closing

Open data lays the foundation. Shared vision turns it into transformation.

- The open data architecture creates limitless opportunities for future systems to integrate, communicate, and scale — beyond just bulk water.
- Real-time, trusted data can power smarter planning, predictive maintenance, and cross-department collaboration across the City.
- With clean, structured, and accessible data, the City is well-positioned to adopt emerging tools like digital twins, AI-driven analytics, and automation.
- The culture of collaboration — across Zutari teams and with the City — has shown what's possible when data becomes a shared asset, not a siloed resource.
- The DSS is more than a platform; it's a stepping stone for a truly intelligent, future-ready city.



