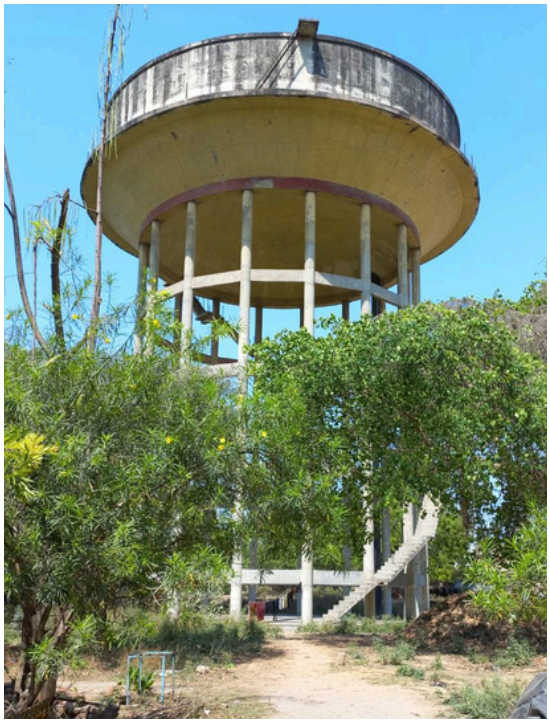
CASE STUDY 2026

JALKAL VIBHAG Nagar Nigam Kanpur
Water Network Pipeline

Prepared By:
NAVIGATIA

INTRODUCTION



In Kanpur's Zone-5, Ward-53 (Sarai Mita), a municipal drinking water network developed and owned by Uttar Pradesh Jal Nigam, operated by Jalkal Vibhag Kanpur Nagar Nignam failed to deliver water to residents despite prior investment and commissioning efforts. For nearly two years, thousands of people were left without reliable municipal supply because the underground pipeline network was effectively invisible: its route, condition & leakage points were unknown. Traditional excavation-based inspection was too costly, too slow, and too disruptive to be viable in a dense urban neighborhood.

In 2025, Kanpur JalKal Vibhag (KWA) partnered with Navigatia, a deep-tech company that built the world's first autonomous snake-like in-pipe mapping and inspection robot, Serpenox, purpose-built for live and decommissioned water pipelines. Over a 5-day deployment, Navigatia mapped and inspected 3.3 km of underground pipelines without excavation, road cutting, or service disruption. Using its proprietary GIS platform, Serviper, the company delivered a defect-annotated digital twin of the network and gave KWA, for the first time, precise visibility into why the system had failed.

PROBLEM

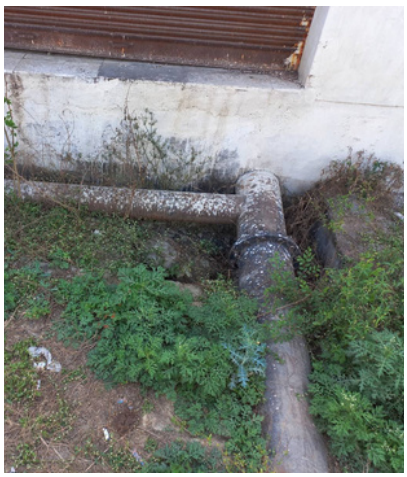
KWA's 2023 attempt to restore water supply in Ward-53 failed because the utility had no reliable map of the buried network and no way to assess internal pipe condition. The authority did not know where the pipes ran, how deep they were, which segments were damaged, or where water was being lost. Illegal ferrule connections, leakage, contamination ingress, deformation, and encrustation could not be detected without opening roads across a dense urban area.

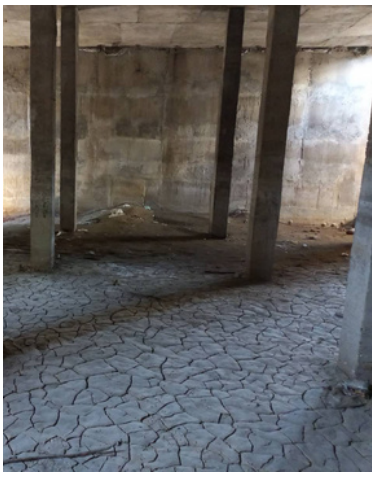
The result was a textbook case of high Non-Revenue Water (NRW): treated water was being lost through leaks, theft, and infrastructure degradation before reaching legitimate consumers. This not only drove up operating costs and undermined network efficiency, but also created public health risk and deepened inequity for households forced to rely on tankers, borewells, and unsafe alternative sources.

SOLUTION

Navigatia deployed Serpenox in two phases: first to map the exact geospatial path and depth of the pipeline network, and second to inspect internal condition and identify defects. The robot autonomously navigated the network through existing access points, collecting visual, positional, and environmental data from inside the pipes. That data was processed in Serviper to create a GIS-based digital twin showing every pipe segment, defect, anomaly, and unauthorized connection.

This gave KWA the intelligence to replace only what was beyond repair, fix salvageable segments, seal illegal taps, reduce NRW, and restore system performance with precision instead of blanket replacement.





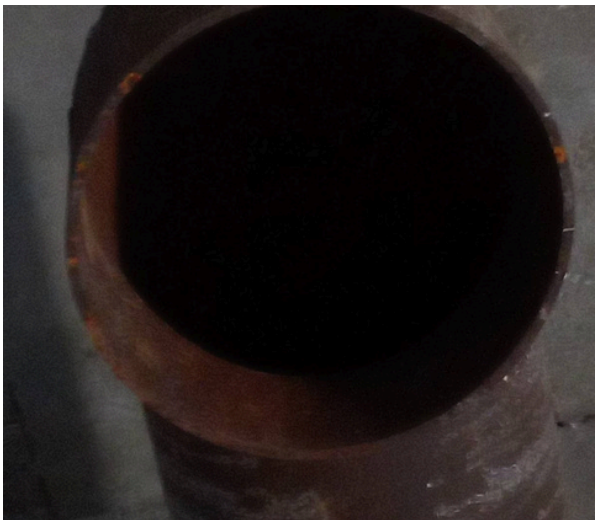
RESULT

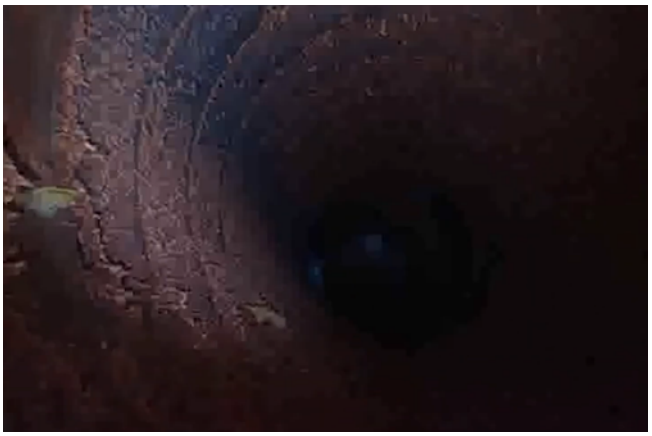
Navigatia transformed a failed and abandoned water network into an actionable recovery plan—faster, cheaper, and smarter than legacy methods.

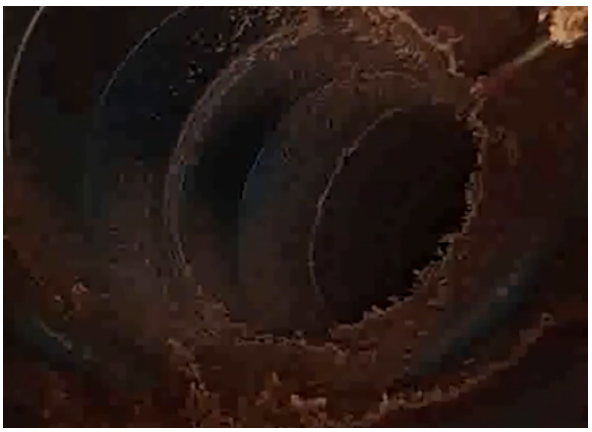
Key outcomes:

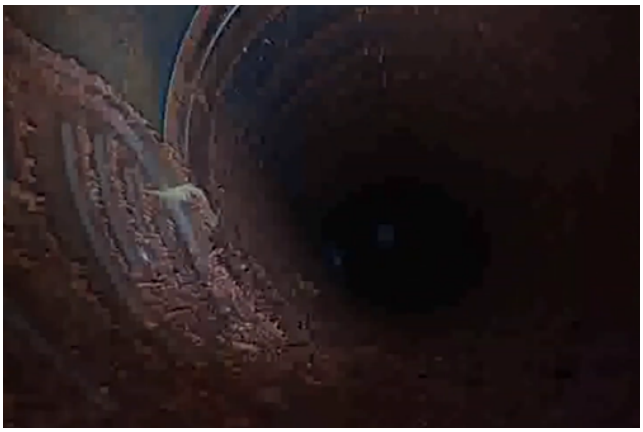
- 3.3 km of buried water pipelines mapped and inspected
- 5 days from deployment to deliverable
- Zero excavation, zero road disruption, zero broad service shutdowns
- Significant cost reduction versus excavation-based inspection and unnecessary full-network replacement
- Clear path to reduce Non-Revenue Water (NRW) by identifying leakage, theft, and flow restrictions
- Improved public health through detection of contamination ingress points
- Enhanced water network efficiency through targeted rehabilitation and pressure restoration
- Enabled the municipality to move toward restoring water supply to affected communities

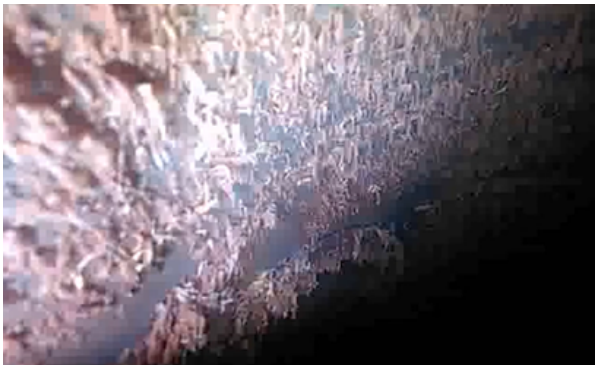
SNAPS FROM INSIDE THE PIPES

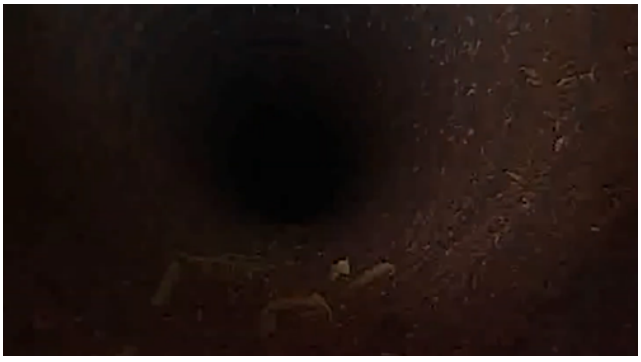


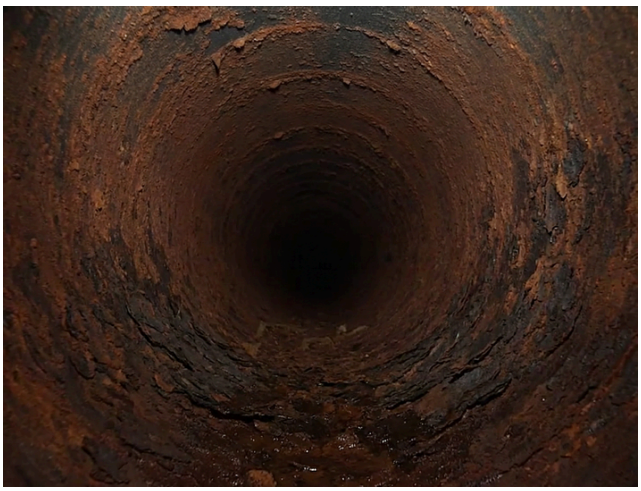












FUTURE

Beyond Kanpur, this deployment demonstrates Navigatia's larger vision: using clean-tech robotics to modernize aging underground infrastructure, reduce water loss, improve public health, and deliver measurable social impact at scale. By replacing hazardous, manual, and excavation-heavy inspection methods with autonomous in-pipe intelligence, Navigatia is not only helping utilities recover water and reduce costs—it is building toward a future where technology can help finally end manual scavenging in India by removing the need for humans to enter dangerous underground utility environments.

Navigatia is creating more than a robot. It is building the intelligence layer for the world's buried infrastructure.