SUCESS CASE

INITIAL LEAK DETECTION ASSESSMENT SERVICE

San Juan de Lurigancho, Peru

SEDAPAL (Lima's Water and Sewerage Service)

aganova

EXECUTIVE SUMMARY

As part of SEDAPAL's Operational Sustainability Plan, the state-owned utility responsible for water supply in Lima and Callao commissioned a preliminary study to detect non-visible leaks along a 6,659-meter potable water pipeline in San Juan de Lurigancho, in San Juan de Lurigancho, with the Peruvian engineering firm WES-FES Group acting as local partner..

This section, running along the right bank of the Rímac River, was inspected using the Nautilus System. The system successfully identified a significant number of critical leaks and structural anomalies in the prestressed concrete pipeline with diameters of DN800 and DN900.

The inspection was conducted with a flow rate of 300 L/s and pressures ranging from 1 to 7 bar. The goal was to reduce Non-Revenue Water (NRW) losses in a district historically affected by high leakage rates, some of which had already caused surface collapses and visible water emergence.

The results provided essential data for planning future maintenance and interventions, helping SEDAPAL enhance the operational efficiency of Lima and Callao's water distribution system.

Client

SEDAPAL

Sections

CP - S.J.L.

Location

San Juan de Lurigancho, Peru

Date

June 28, 2024

Diameter

DN800 & DN900

Speed (m/s)		Pressure (bar)		Distance (m)
Min	Max	Min	Max	
0.41	0.62	2.20	3.90	6,659

INTRODUCTION

SEDAPAL is a state-owned company governed by private law and fully owned by the Government of Peru. Its mission is to provide high-quality drinking water, sewerage, wastewater treatment, and reuse services to meet the needs of the population in Lima and Callao.

As part of its strategy to achieve operational sustainability and reduce potable water losses, SEDAPAL set out to implement targeted actions to reduce Non-Revenue Water (NRW), focusing specifically on districts with the highest leakage rates.

PROBLEM

A 6,659-meter pipeline section located in San Juan de Lurigancho, running along the right bank of the Rímac River, was selected for inspection.

In this segment, leaks had already been identified at bell-and-spigot joints, as they had caused pavement subsidence and surface water emergence, making their locations partially known. Additionally, the network is considerably old and had never undergone an internal inspection.

SEDAPAL's technical management was aware of the network's advanced state of deterioration, making it essential to precisely locate all existing leaks.

SOLUTION AND IMPLEMENTATION

On June 27, 2024, a non-invasive internal inspection was carried out using our Nautilus system—an advanced technology specialized in acoustic leak detection and structural assessment of pressurized water networks, in collaboration with the Peruvian engineering firm WES-FES Group as local partner.

After validating the insertion and extraction points, the device was deployed at 10:30 p.m. and operated until 2:17 a.m., covering over six kilometers without interrupting water service.

Throughout its journey, Nautilus collected high-resolution acoustic and physical data, enabling the precise detection of hidden leaks, air pockets, and potential structural faults.

The pipeline segment inspected had the following characteristics:

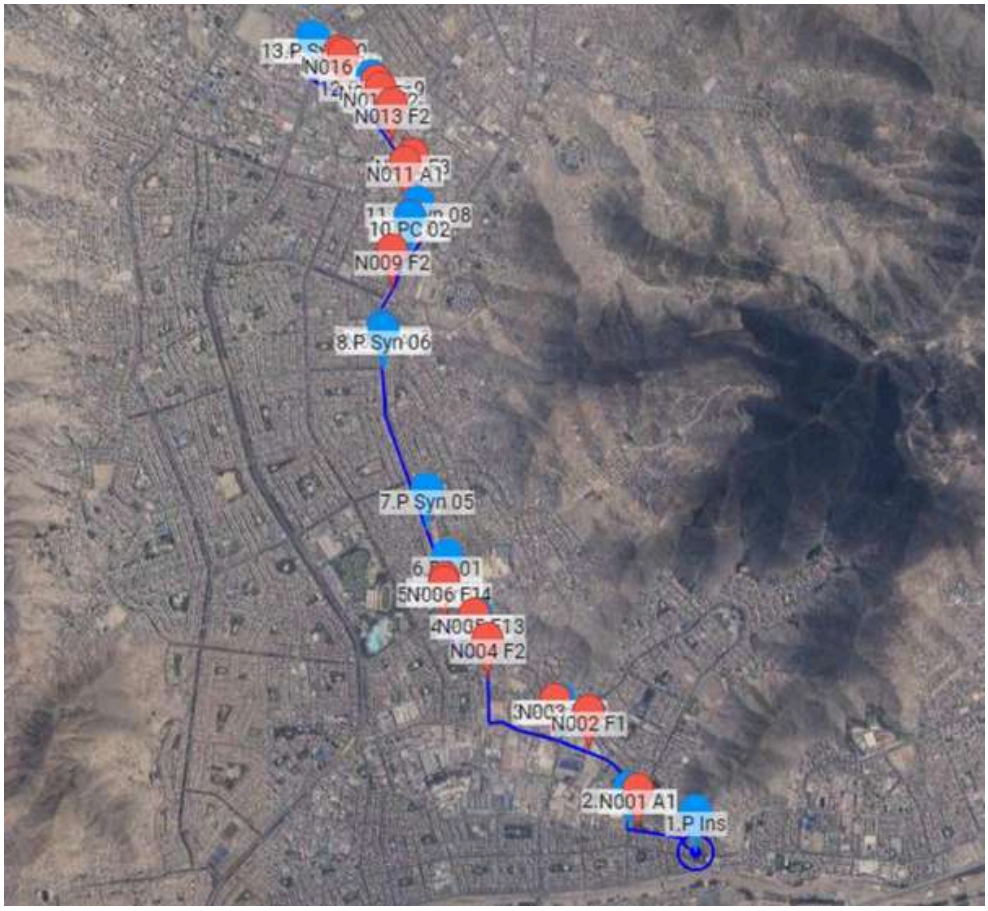
	Section 1
Location	San Juan de Lurigancho, Peru
Flow rate	Between 0.41 and 0.69 m/s
Diameter	Between 800 and 900 mm
Water speed	0.47 m/s
Presure	2.30 and 3.90 bar
Insertion point	DN150 gate valve
Extraction point	DN150 gate valve

Inspected Section

Image caption (left): Installation of the insertion system (left) and setup of the extraction system (right)

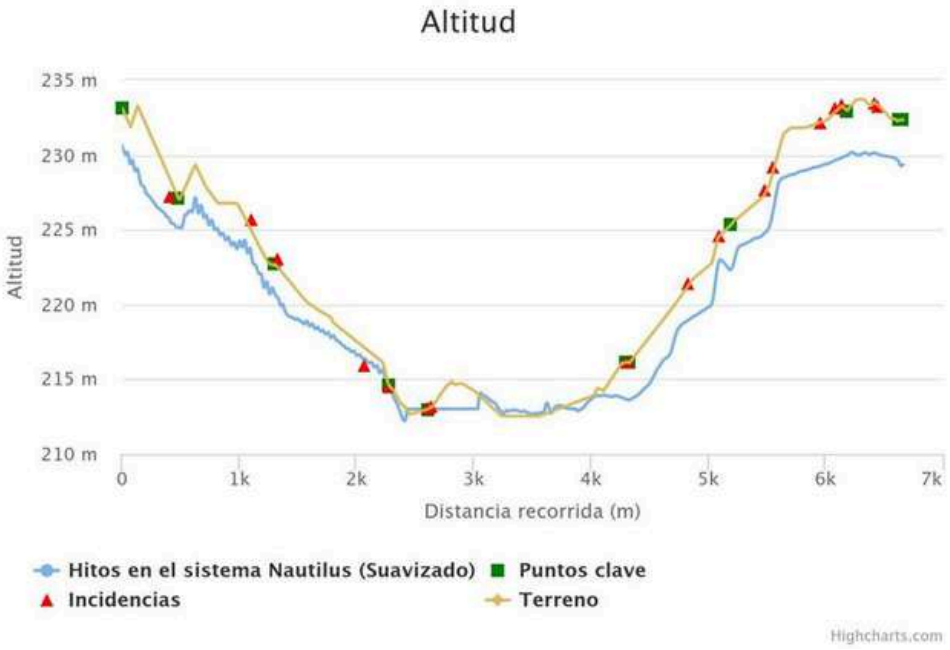
RESULTS

Below is an overview of the incidents detected, visualized through the Nemo Platform. The red markers on the map correspond to leak locations and anomalies identified during the inspection. The base map was provided by SEDAPAL's GIS database.



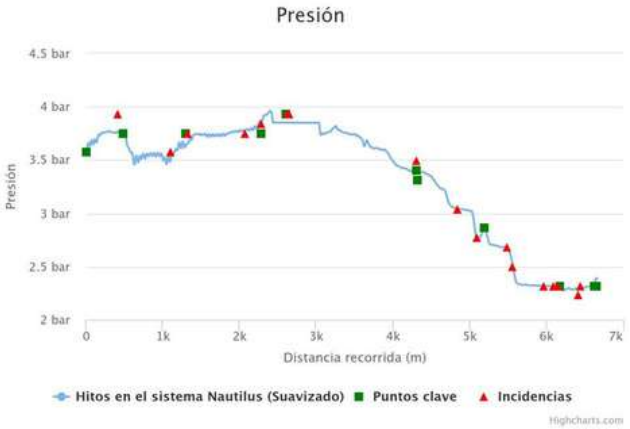
Aerial view of the inspected pipeline with detected incidents

The following chart displays the pipe's elevation profile (in blue), based on the data collected by the Nautilus sphere, overlaid with the terrain profile (in brown).



Pipeline elevation profile

Thanks to the integrated pressure sensor in the Nautilus system—which records pressure values at regular intervals during the inspection—it is possible not only to accurately estimate leakage flow rates but also to derive an approximate pressure profile of the pipeline based on hydraulic principles.



Pressure profile along the pipeline

Real-time positioning data

Pinpointing

Pinpointed excavation of the main identified leak

CONCLUSIONS

The analysis of the data recorded by Nautilus revealed a high number of incidents along the inspected pipeline, with precise location data for each one.

Aganova recommended prioritizing repairs on those leaks with the highest flow losses and easiest access for intervention. For smaller leaks with minimal impact, a monitoring plan was advised to track their evolution over time.

Furthermore, Aganova strongly recommended expanding the use of the Nautilus technology to conduct a comprehensive inspection of the rest of the pressurized network operated by SEDAPAL.

Following Aganova's recommendations, SEDAPAL prioritized the repair of the leak with the highest detected flow rate. This specific leak was excavated first due to its considerable impact on system performance.

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