



Case Study

Oldonyiro, Kenya

ARlavCAD analysis enables correct installation of properly-sized and located air valves, ensuring smooth flow of water from source to destination

Background

In an irrigation project in Oldonyiro town in Isiolo county, Kenya, executed by the National Irrigation Authority through a local contractor, water is pumped through an OD315 uPVC rising main pipeline from the Ewaso Ng'iro River to a reservoir tank. The water then flows from the reservoir to irrigation distribution systems downstream. Just four D-040 air valves had been installed along the >9 km-long pipeline – a model smaller than required, and less than half the number of valves needed for such a distance.



Challenges Constant pipe bursts during pumping tests

During test pumping, the pipeline experienced various bursts. The water was never successfully pumped above 10 bars of pressure, the level required to pump it to the reservoir tank. No air valve sizing and location analysis had ever been conducted, and the pipeline did not have drainage valves installed, making it impossible to drain the pipe to remove debris during test pumping.

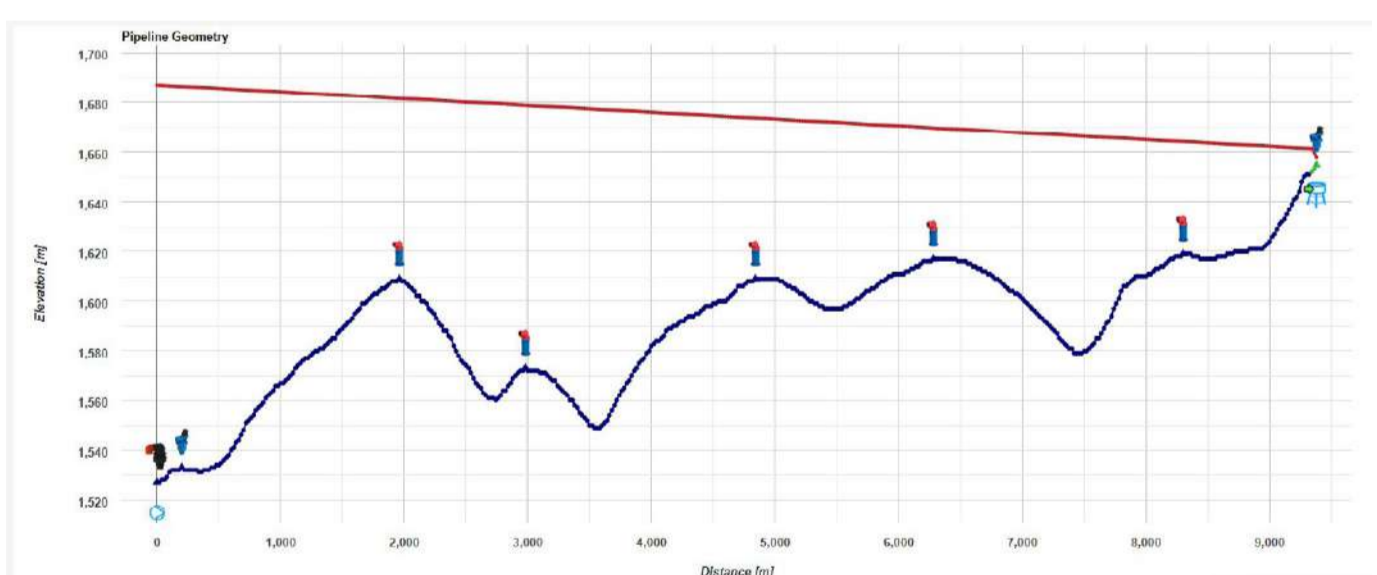


Solution Air valve sizing and location analysis

Air valve sizing and location analysis was carried out using ARlavCAD sizing and location software. Following this analysis, D-46 air valves, properly sized and with the required air flow capacity, were installed along the pipeline to minimize pressure transients, control air, and optimize flow. Air vent pipes were installed on the air valve chambers, and washouts were installed at all the low points, to enable flushing of debris from the pipeline.

ARlavCAD Sizing and location report

Data collected from the field was input into the ARlavCAD and analysis was carried out. The ARlavCAD graphical representation below shows the locations and types of air valves required.



Technical spec A finely-tuned balance

Turbine and Pump Specifications Particulars	Parameter
Turbine Discharge	1.8m ³ /s
Turbine Power	136kW
Turbine Speed	750r/min
Penstock (spiral Welded pipe)	DN1100mmX63X12m
Pump Head	160m
Pump Discharge	0.0734m ³ /s
Pump Speed	1500rpm

Results All systems go

Following installation of the new A.R.I. D-46 air valves in accordance with the ARlavCAD analysis, the air locks and accumulated debris that had prevented water flow were eliminated, and the upsurges and down surges that had been causing pipe bursts were mitigated. As a result, water is now successfully pumped to the reservoir tank.

