



Project summary

Organization:
PT Wika Tirta Jaya Jatiluhur (WTJJ)

Solution:
Water and wastewater

Location:
West Java, Indonesia

Project playbook:
Bentley LumenRT™, iTwin® Capture,
iTwin IoT, MicroStation®, OpenFlows™,
OpenSite®, PlantSight, PLAXIS®,
ProjectWise®, SYNCHRO™

Project overview

WTJJ constructed 80 kilometers of clean water system, including intake structures, treatment facilities, pumping stations, and transmission mains.

They faced complex integration of digital workflows across multidiscipline entities, topographical challenges, multijurisdictional logistics, and stringent environmental conservation requirements to deliver the clean water system.

To address these challenges, WTJJ implemented a complete digital ecosystem with Bentley tools.

ROI

WTJJ achieved a 22% net ROI increase thanks to digital efficiency, risk reduction, and optimized resource use.

They avoided IDR 12 billion (USD 750,000) in costs related to rework, trench collapse risks, downtime, and damage claims.

Project delivery was 25% faster, with about 60 work days saved and 15,000 work hours saved by going digital.

WTJJ delivers a digitally driven, sustainable water supply system in Indonesia

Aligning Bentley's digital applications with target value delivery helped reduce groundwater dependence, boosting ROI by 22%

Enabling better quality of life for better tomorrow

Home of over 30 million people, West Java's communities were facing a growing water crisis. To deliver reliable, safe drinking water to these rapidly growing urban areas without deepening the impact to the environment, the SPAM Regional Jatiluhur I – transforming water for a better tomorrow project was conceived and delivered by PT Wika Tirta Jaya Jatiluhur (WTJJ).

As the implementing entity, WTJJ was mandated to supply 4,750 liters of treated water per second to Jakarta, Bekasi, and Karawang. "This multiregional initiative addresses the critical challenge of reducing dependency on groundwater extraction, mitigating land subsidence, and ensuring equitable water access in one of the world's densest urban corridors," explained Rizky Yusuf Ramadhan, WTJJ's BIM lead strategist for the project.

From the outset, WTJJ was guided by environmental, social, and governance principles and framed as a digitally enabled initiative. The team adopted a target value delivery (TVD) approach, setting clear objectives for cost, schedule, quality, and sustainability even before design began.

Organizational and environmental challenges

Delivering an 80-kilometer regional water pipeline through multiple jurisdictions and sensitive environments required precise coordination and solid risk management.

Ramadhan explained that, internally, "the project faced complex integration of multidisciplinary digital workflows across engineering, procurement, and construction teams." All the entities needed to work from a single source of truth with pandemic-era constraints and remote collaboration. Externally, the challenges were different. "The project encountered topographical challenges and stringent environmental conservation requirements around the Jatiluhur reservoir," said Ramadhan. Sensitive wetlands, riverside zones, and existing communities had to be preserved or minimally disturbed.

Traditional, siloed CAD tools and spreadsheet-based coordination were not adequate for a project of this scale and complexity. Fragmented information increased the risk of clashes, rework, and delays that would have impacted both the TVD and WTJJ's environmental commitments. The team sought to unify planning, design, construction, and operations under a single digital framework, enabling real-time collaboration, risk mitigation, and faster delivery.

Target value delivery powered by a digital ecosystem

To keep value targets front and center, the project team leveraged Bentley's integrated solutions to establish a unified, intelligent workflow that removed data silos and enabled seamless multidiscipline collaboration. To share secured information with all disciplines, WTJJ

implemented ProjectWise as the common data environment (CDE). The other key components of the digital ecosystem included OpenFlows for real-time simulations and optimizing pipeline sizing and pump performance, PLAXIS for its ability to predict geotechnical modeling, and OpenSite and MicroStation for optimizing earthwork volumes. Using PLAXIS and OpenSite throughout the construction process allowed the preservation of wetlands and sensitive zones, reducing the environmental footprint of the project. PLAXIS also avoided any record of pipeline failures during commissioning.

Meanwhile, SYNCHRO 4D was used to link the 3D model with the construction schedule. WTJJ also leveraged Bentley's iTwin Capture, iTwin IoT, and PlantSight to create the digital twin that helps inform real-world design decisions and predictive maintenance.

The project sits at the intersection of technology, sustainability, and community impact. "Digitalization empowered the team to optimize workflows, minimize rework, accelerate timelines, and enhance decision-making through real-time collaboration within ProjectWise's CDE," said Ramadhan. This integrated digital ecosystem ensured that design, construction, and operations teams were always working from up-to-date data, reducing errors and enabling faster decisions based on evidence.

Digitalization enhances public health and sustainability

When the WTJJ project began, it had already become Indonesia's first water infrastructure project to implement a full Bentley-driven digital lifecycle, setting a new benchmark in the water sector in the country. The impact of the model on governance and decision-making was immediate and measurable. "Where multiparty design reviews

previously took up to 10 working days, Bentley-powered 3D simulations and dashboards reduced review cycles to less than an hour," commented Ramadhan. This helped avoid unnecessary extra costs caused by miscoordination.

Overall, the digital TVD strategy reduced the need for design rework by 30% and the cross-discipline design repetitions from four cycles to one or two. It also boosted productivity by 35% thanks to automated reporting and synchronized workflows and saved approximately IDR 12 billion in potential rework costs.

On the sustainability front, "The WTJJ project addressed critical sustainability challenges by reducing groundwater dependence, cutting 1,200 tons of carbon emissions, and achieving 18% energy savings," noted Ramadhan. Optimized hydraulic design reduced pump-station energy use, while better sequencing and minimized rework cut unnecessary transport and material waste. WTJJ's work on the project delivered immediate environmental and social outcomes, beginning with improved water safety and public health for more than 900,000 residents. In addition, the digital twin ecosystem continuously monitors pressure and performance, supporting long-term resilience by enabling proactive maintenance instead of reactive repairs.

By aligning digital innovation with TVD and sustainability goals, WTJJ demonstrated how modern water infrastructure can be both high-performing and deeply responsible. The team shifted to a modern surface water system that directly supports public health, lowers the risk of land subsidence, and improves climate resilience. They proved that when advanced digital tools, disciplined value-driven management, and sustainability objectives converge, it can transform water for a better tomorrow.

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Bentley's solutions enabled us to transform water infrastructure delivery with a strong focus on environmental stewardship, community impact, and long-term resilience.

— Rizky Yusuf Ramadhan, BIM Lead Strategist, PT Wika Tirta Jaya Jatiluhur (WTJJ)



Masterplan of WTJJ's clean water facility, integrating technology and environmental stewardship.