

SHANGHAI WATER DESIGNS NEW PUMP STATION TO REDUCE YANGTZE RIVER FLOODING

ProjectWise Seamlessly Connects All Participants, Improving Collaborative Efficiency by 25%



BY JAMES KELLY | Product Marketing Manager, Bentley Systems



Image caption/courtesy 1: Shanghai Water Engineering was tasked with constructing a pump station with a capacity of 90 cubic meters per second and a sluice gate with a net width of 30 meters. Image courtesy of Shanghai Water Engineering Design and Research Institute Co., Ltd.

REDUCING FLOODING IN SHANGHAI

Shanghai is located on China's central coast, where the Yangtze River empties into the Pacific Ocean. Its location makes it subject to storms and severe flooding, as the terrain is low and

flat with a dense river network. Global climate change has only exacerbated these issues and has increased the risks associated with controlling floods and waterlog. To help reduce the frequent flooding, the city implemented the South Extension Renovation Project of the Zhangjing River. This project included constructing a pump station with a capacity of 90 cubic meters per second, a sluice gate with a net width of 30 meters, and other elements that include bridges, revetments, roads, and pipelines.



Image caption/courtesy 2: They developed a connected data environment in ProjectWise, allowing all participants and stakeholders to work collaboratively by designing components of the project simultaneously. Image courtesy of Shanghai Water Engineering Design and Research Institute Co., Ltd.

With 43 years of experience, Shanghai Water Engineering Design and Research Institute was tasked with delivering this USD 300 million project. They would need to work around many existing structures, including factories, residential buildings, railways, municipal roads, pipelines, and underground obstacles. Additionally, to successfully complete this complicated project, the team would need to work with many engineering services teams across various disciplines.

APPLYING BIM WORKFLOWS ACROSS THE PROJECT LIFECYCLE

To overcome the challenges of their short design timeline and the vast amount of work required, Shanghai Water Engineering needed to ensure that their teams maximized productivity and minimized risk. They served as the design unit on a project involving many disciplines and units, a wide scope, and

complicated design requirements. As such, Shanghai Water Engineering wanted to find a way to enable their teams to conduct design work and reviews quickly and easily, while managing project information throughout the asset lifecycle. In particular, implementing BIM models and technology could open up the transfer of information between project phases, as well as ensure its integrity and compliance to key standards.

Therefore, they looked for software that would allow them to apply BIM workflows across the entire project lifecycle. The entire team needed to be able to readily share their design work with one another, provide feedback, and process deliverables to completion. Additionally, they needed a way to ensure that project standards and best practices were being adhered uniformly, without needing to rely on inconsistent, manual methods of enforcement.

WORKING IN A CONNECTED DATA ENVIRONMENT

After looking at various software solutions, Shanghai Water Engineering chose Bentley applications to develop a full information 3D model. With the aid of ProjectWise and BIM technology, they developed a connected data environment for all project information. The team used the ProjectWise design collaboration platform to simultaneously carry out the multidiscipline design. Additionally, they used the ProjectWise-integrated BIM model for comprehensive demonstration, which provided favorable support for expert review and communication and coordination. This system enabled all participants and stakeholders to efficiently collaborate to solve complex problems while providing integrated delivery.

Once they established a connected data environment, Shanghai Water Engineering set about developing



Image caption/courtesy 3: ProjectWise's connected data environment improved overall collaborative efficiency by 25%, saving three months on the project and USD 60,000 in cost. Image courtesy of Shanghai Water Engineering Design and Research Institute Co., Ltd.

the design of this pump station. OpenBuildings Designer helped build a 3D model of the complicated design. That design model was then integrated into the construction site model, ensuring that construction would run smoothly and be well organized. Using ContextCapture, they established a reality model that could reflect the entire project throughout its lifecycle, as well as the surrounding areas.

IMPROVING COLLABORATION WITH BIM WORKFLOWS

By using a BIM technology throughout the design, construction, supervision, and management of this project, Shanghai Water Engineering standardized modeling and delivery. They developed a set of standardized, whole-process delivery workflows to better manage drawings, schedules, quality, and safety in the design and construction phases. ProjectWise's connected data environment acted as the single source of truth for all information and improved overall collaborative efficiency by 25%, saving three months on the project and USD 60,000. Combined with Bentley design solutions, Shanghai Water Engineering uncovered and resolved several construction process clashes, reducing rework, cutting costs, and shortening the building schedule. They improved design efficiency by

20%, cut down communication time by a month, and saved USD 15,000 in labor costs. The project is on schedule to be completed by mid-2021. The project succeeded as a major pilot for applying Bentley's BIM methodology across the whole lifecycle of water conservancy projects in Shanghai.

PROJECT SUMMARY

Organization

Shanghai Water Engineering Design and Research Institute Co., Ltd.

Solution : Project Delivery

Location : Shanghai, China

Project Objectives

- ❖ To construct a pump station with a capacity of 90 cubic meters per second.
- ❖ To collaborate with many engineering services teams across various disciplines.

Products Used: ContextCapture, LumenRT, MicroStation, OpenBuildings Designer, OpenRoads, ProjectWise

Fast Facts

- ❖ Shanghai Water Engineering had to construct a pump station with a capacity of 90 cubic meters per second and a sluice gate with a net width of 30 meters.

- ❖ They developed a connected data environment in ProjectWise, allowing everyone to simultaneously design components.
- ❖ Using BIM methodologies throughout the project lifecycle, Shanghai Water Engineering standardized modeling and delivery.

ROI

- ❖ ProjectWise's connected data environment improved overall collaborative efficiency by 25%, saving three months and USD 60,000.
- ❖ Combined with Bentley design solutions, Shanghai Water Engineering resolved several construction process clashes, reducing rework, cutting costs, and shortening the schedule.
- ❖ They improved design efficiency by 20%, cut down communication time by a month, and saved USD 15,000 in resource hours.

Callout: Using a BIM methodology throughout the design, construction, supervision, and management of the project standardized modeling and delivery.

About the Author

James Kelly is a product marketing manager, project delivery at Bentley Systems. He is responsible for the worldwide marketing of Bentley's ProjectWise solution, as part of Bentley's offering of Project Delivery solutions, for all industries and markets. He has been a product marketing manager at Bentley for two years.

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