Chandrawal Water Supply Project - 477 MLD Advanced Water Treatment Plant

“For the Chandrawal Water Supply Project, we had less than half the space typically required for a plant with this level of output. We could only approach this challenging infrastructure design by using BIM.”

— M. Balasubramani, General Manager and Head of WSD-EDRC, Water & Effluent Treatment - IC L&T Construction - India

Challenges

New Delhi is one of the largest and most densely populated cities in the world. Providing clean and safe drinking water is a monumental challenge—as well as finding the space for the actual water treatment plant.

The Chandrawal Water Supply Project - 477 MLD Advanced Water Treatment Plant—an engineering, procurement, and construction (EPC) project awarded by the Delhi Jal Board—is a first of its kind for ozonized disinfection in India at an output scale of 477 MLD (million liters per day). The L&T Construction, Water & Effluent Treatment-IC team took on the challenge of an EPC project along with water supply and is considered a “water stressed zone” of New Delhi.

The Engineering Design & Research Center (EDRC) of L&T Construction faced site constraints from the very beginning as it is an integration with an existing 182 MLD water treatment plant and 36 MLD recycling plant. The current plant serves 1.3 million people with a conventional treatment system that could not handle the toxic pollutants present in the raw water. The new treatment plant will serve 2.3 million people with continuous, uninterrupted water supply.
“Only with BIM, we were able to optimize the plant layout and engineering to save time for all of the deliverables and approval process.”

— Arun Venkadesh, Senior Engineering Manager - BIM and Digital IC L&T Construction - India

— Arun Krishna, Assistant Engineering Manager - BIM, WSD-EDRC, Water & Effluent Treatment - IC L&T Construction - India

Also built within the limited space, the new administrative Centre Water Management Centre (CWMC) will completely control and monitor the entire water network, including all water treatment plants and connections for New Delhi.

**Solutions**

Due to the site and space constraints, it was extremely difficult to finalize the hydraulic design and installations for the project. It had to be matched with the existing 182 MLD units in order to maintain equal distribution to proposed or existing units. According to the team, they could only achieve the new additions and increasing the capacity of the plant within the current site by having the ability to view and see the 3D models with BIM.

But they aren’t stopping there with 3D BIM. 4D BIM is being implemented for planning and scheduling, 5D BIM for cost monitoring during capital expenditures, 6D BIM for sustainability in the solar power energy management, and 7D BIM for operations and management.

To reach important sustainability goals set by the owner, the plant will be built with solar power generation. To create this energy efficient system, solar path analysis has been verified with the help of Revit for optimum location of panels. The use of the AEC Collection—including Civil 3D, Revit, Navisworks, AutoCAD, and Dynamo—is boosting quality construction and scheduling. Virtual construction, clash detection, and AR/VR reviews are completed before the release of any engineering deliverables.

**Key Insights**

- With a tight timeline and budget, the team realized 20% time savings (approximately 4500 hours) and $300,000 USD with 3D BIM and concurrent design and engineering.

- 3D visualizations aided in seamless and easy approval from clients by transparent communication.

- With Dynamo, the team can control the parametric models in Revit, resulting in a larger number of iterations and options within a shorter period.