

COMPANY

TATA Consulting Engineers Limited

LOCATION

Mumbai, India

SOFTWARE

AutoCAD Map 3D®**AutoCAD Civil 3D®****Autodesk®InfraWorks 360®****Autodesk®Navisworks®**

Setting a new standard with BIM

TATA Consulting Engineers Limited delivers Mega City on Autodesk solutions.



Image courtesy: TCE

TATA Consulting Engineers (TCE) Limited, a wholly-owned subsidiary of TATA Sons Ltd is an integrated engineering consultancy solutions provider. Founded in 1962, the company offers engineering services from concept to commissioning in key industry segments like power, nuclear & advanced technologies, chemical, infrastructure, master planning for townships, steel mining & metals and construction management.

The Mumbai-based company also has its offices in New Delhi, Pune, Jamshedpur, Kolkata, Bengaluru, Chennai, South Africa, Qatar and USA. TCE has successfully delivered more than 7,150 projects to clients across the globe and is an established name in India, Middle East, Africa and the USA.

TATA Consulting Engineers' consultancy solutions include engineering consultancy services such as feasibility studies, pre-project reports and technical studies, design, engineering, detailed engineering, environment impact assessment, sustainability and green technology solutions. Apart from this, the company also provides project management consultancy services include EPCM services, project management services, equipment management and commissioning support; construction management consultancy includes construction, support and safety management services.

The firm has an international reputation for its

work in the infrastructure sector, confirmed by many notable design awards for its environment and sustainability contributions that reflect the firm's success in managing complexity and improving lives around the globe.

The Project

One of the country's largest infrastructure group is working to create a truly unique project - Mumbai's sister city. It has been designed keeping in mind the global demands and criteria to be amongst the top 50 most livable cities of the world. This includes a vibrant business environment, outstanding educational and healthcare facilities, unparalleled cultural and sports infrastructure, and safe public spaces, in addition to high quality residential apartments at affordable prices.

This mega city aims to be the model for 21st century urbanization in India where citizens, administrators and developers come together to create world-class opportunities of growth and prosperity.

Located near Mumbai, the project is at the epicenter of business and provides a holistic, urban environment.

Efficiency goes hand in hand with sustainability - a salient feature of the project, be it through treatment of water and sewage, use of renewable energy or an eco-friendly transport service. Other utilities such as hospitals, schools, retail malls, entertainment facilities and security have also been planned. This is not all; large open green spaces, green buildings and use of solar

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energy have also been proposed. The aim is to bring vitality to the city, safety to streets, foster social cohesion and generate environmental benefits. By putting residential, commercial, institutional and recreational uses in close proximity to one another, the goal is towards shaping the project into a smart city.

The Challenges

This planned city development will spread across 4,000 acres, containing all amenities that would set the standard for smart cities in India. The project has been divided into three phases, of which Phase I is racing toward completion. TCE is now working on Phase II that is spread across 700 acres.

The mega city, strives to be an attractive, lively, and environmentally focused city. In 2009, a master planning process was set for the whole city for better functioning. Background information, research, surveys, and all development plan related data are a must; also it has to be up-to-date in a central system for every phase of development. It would not be possible with traditional 2D tools.

The developer wanted the projects to be turned around at an increasing pace, which means that the firm had to reassess some of the ways it was working to meet deadlines. TCE had to be incredibly efficient with apt skills on latest technology to meet this requirement. It was known that accurate and realistic visualization of the project would play a significant role to make the mega city a success.

The project is planned keeping in mind the effects of climate change which include rising sea levels, an increased frequency and severity of storms, precipitations, floods, droughts, hurricanes, heat waves and other extreme weather conditions. It is therefore important to maintain the resilience of the township with the quality of the local management, its capacity to anticipate and enforce the availability of information and the quality of the infrastructure and services that the city provides. It has become apparent to design such urban areas with much more attention to climatic considerations.

Additionally, as the project is huge and involves many utilities together, including power, water supply, gas, storm water lines, roads, etc. there was a need to have better coordination and information transfer between team members working on the project.

The Solution

TCE found that the use of Autodesk BIM

solution helped them speed up the process of undertaking quantitative environmental analysis at the very initial master planning and massing stages. How various factors affect key environmental targets could be assessed. It brought design teams together and ensured that design and analysis does not remain an isolated and non-iterative activity.

Design is the foundation of TCE's business. It is important that this vision can be demonstrated to inspire clients. Using Autodesk Revit, TCE was able to produce an interactive yet flexible representation of every element involved in this mega project. Advance features in Revit helped to alter many variables and produce options that responded to the brief while also providing real-time feedback that ensured TCE stuck to stringent sustainable design requirements.

With the use of Autodesk Infrastructure Design Suite, TCE could integrate and manage various design stages including site planning and project monitoring. In the planning stage, it helped access various data sources and take it to the land database without any additional plugin. Autodesk Infrastructure Design Suite's built-in advance features became a timesaver and helped produce scalable drawings and rendered plans of complete city – all in one program. Complex jobs like grading, road design, utility design, clash detection and early visualizations have been undertaken using AutoCAD Map 3D, AutoCAD Civil 3D, Autodesk InfraWorks, Autodesk Navisworks and Autodesk 3ds Max Design, all part of the design suite. Overall, BIM solution accelerates the visualizations and computations to test multiple scenarios and achieve the best design solutions.

The information found in digital models of Autodesk BIM solution lead to better informed decisions for more efficient use of energy, water, materials, and land, whether designing a building, utility network, road or bridge. BIM helped TCE to integrate design, simulation, and visualize into their workflows. This provides greater insight on how to use energy, water, and land throughout the lifecycle of city infrastructure more efficiently. It also leads to more efficient use of materials and contributes towards reduction of waste. So BIM is central to assessing resource usage in such projects and promotes sustainability in building construction.

Results

Use of Autodesk BIM solution has revolutionized the way TCE works. It was not only easy to use but also helped the team aggressively working towards matching the time schedule. Inter-office collaboration has also improved

dramatically. Autodesk BIM provided seamless and collaborative working environment that enabled multiple disciplines to design collaboratively, share project information and make informed decisions. The product integration avoided repetition and data loss in the information transfer process and maximized the benefits of 3D design.

Using the BIM capabilities TCE is now able to work closely with the client to transform commercial vision for the mega city project into iconic architectural design with the theme 'City of Opportunity' and put it into implementation.



Image courtesy: TCE