

Scott Wilson Limited

Project:
Kai Tak Nullah Improvement Works at Prince Edward Road East

Location:
Hong Kong

Type:
Urban Drainage

Scheduled Time of Completion:
2012

Design Smarter and Faster with BIM



Construction of the culvert under Prince Edward Road East.

The Kai Tai Nullah is a watercourse starts from the south of Diamond Hill, winds through the existing urban districts of Wong Tai Sin, San Po Kong and Kowloon City, and then runs straight through the former Kai Tak Airport before discharging into Kai Tak Approach Channel. The primary role of the nullah is for flood protection purpose in Eastern Kowloon serving Wong Tai Sin, Diamond Hill, Lok Fu, San Po Kong, Kowloon City and part of new Kai Tak Development Area. However, flood events in recent years indicated that the drainage capacity of certain sections of the nullah is not adequate to meet the current flood protection standard. Thus, the flood relief functions of the nullah must be improved.

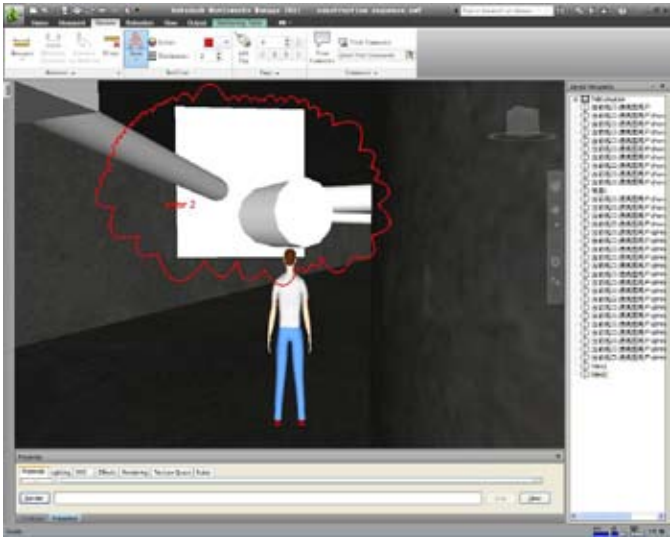
Scott Wilson was commissioned by Drainage Services Department to design solutions that would enhance the nullah's performance to minimize flood risk, extend its service life, and to provide landscape/amenity area for public use. As part of the assignment, Scott Wilson is designing the box culvert below Prince Edward Road East (PERE). Scott Wilson is using BIM technology for box culvert design, utility diversion planning and presentation of construction sequence. The same technology will be applied to the design of the remaining 600m of the nullah upstream to be implemented at a later stage.

The site is in a congested area of Kowloon with a health centre, schools, urban infrastructure and heavily-trafficked roads. In addition, there is also an existing nullah with a decked section underneath the road. Underground utilities and bridge foundations add to the

complexity of the project. To tackle the problem, Scott Wilson used BIM software to build a 3D information model to show the complex connections of the above-ground and underground networks. With BIM, the site context was clarified and site constraints were better understood which helped Scott Wilson to optimise the placement of the box culvert and utility diversion.

Using BIM for Real-Time Navigation

Traditionally, thousands of 2D technical drawings are produced for a complicated project. These 2D drawings demand expert knowledge and analytical skills to decode and the images can be difficult to understand. "After switching to the BIM model, our project team could visually experience the design and influence it in a more intuitive way", said the Scott Wilson Project Engineer, Wei Qi Jin.



Autodesk Navisworks delivered 3D coordination, 4D planning, photorealistic visualization, dynamic simulation and accurate analysis.

Presenting proposed design solutions was much simpler and clearer. No longer needing to flip through hundreds of pages to illustrate their design, the project team referred to all the details represented in one single model.

Using BIM for Clash Detections

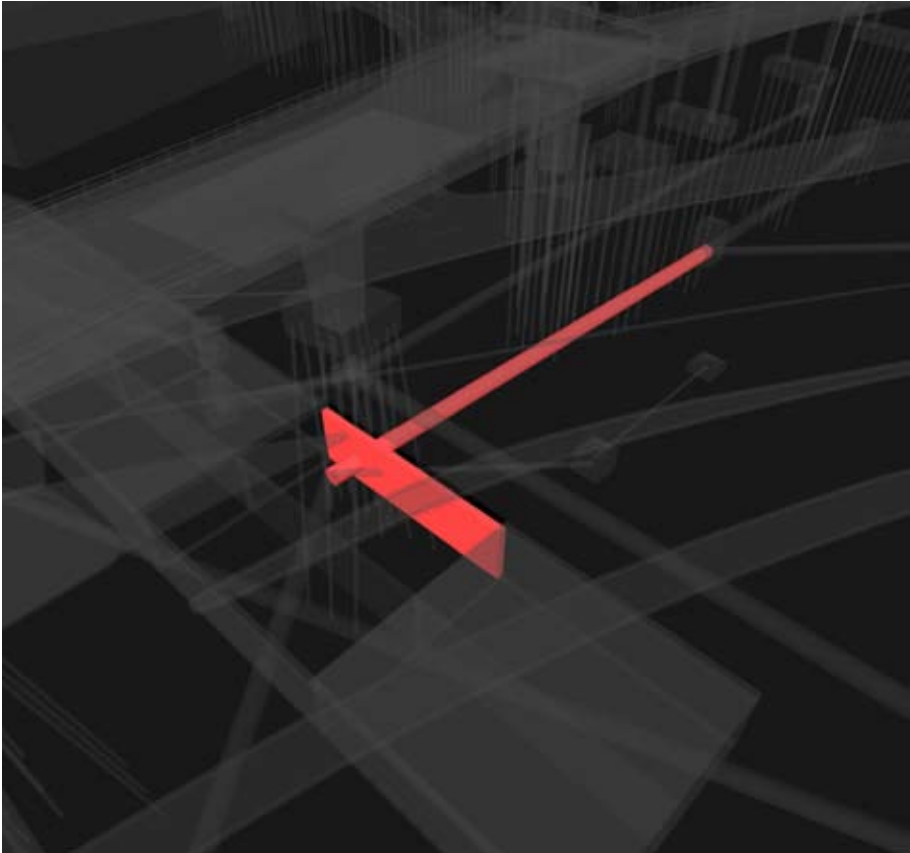
“The site constraints were extremely complicated, and a lot of time would be needed for careful design planning if we were still using the traditional methods,” said Jin. With BIM though, the Scott Wilson team was able to build the BIM models of all existing infrastructure first and then combine it with

the new culvert design to identify clashes. Jin commented, “In the past, we checked for interference between different systems on the 2D and then we had to examine the line and alignment one by one to avoid clashes. This was a time-consuming and painful process. With AutoCAD Civil 3D, however, the check was done automatically and we implemented changes efficiently. Time was saved and the process became fun!”

The following is an integration of all BIM models which includes existing utilities, foundation, terrain and proposed box culvert of this area:



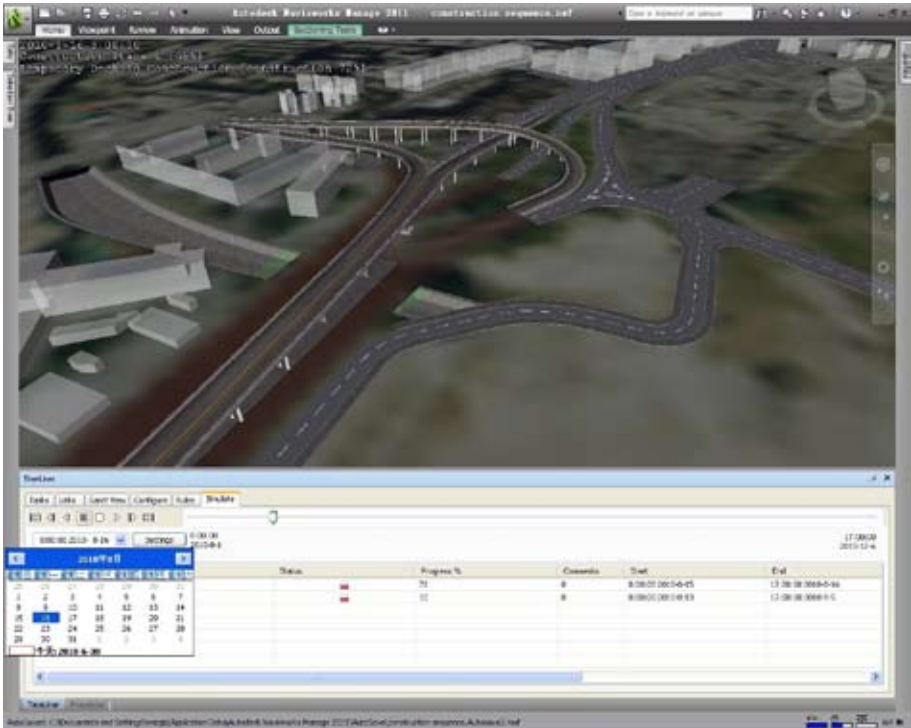
Clashes could be identified in a combined BIM model:



Using BIM for 4D Construction Phasing

Given the success of BIM during design, the project team used building information models for construction planning. By adding schedule dates to a 3D model, Scott Wilson created a 4D building information model, which

enabled the team to review and respond to construction sequencing. This 4D model could be utilized for presentations to the public and government stakeholders.



BIM was used in construction phasing.

The results proved that using BIM technology was cost effective, efficient and could identify and solve potential problems and clashes well before construction started. Images and illustrations produced will also facilitate promotion of the project among stakeholders and the public.

Scott Wilson has also employed BIM technology on other projects. In a previous site analysis study, we used the Water Drop Analysis tool in AutoCAD Civil 3D to determine the possibility of flooding. On another project, Autodesk Ecotect Analysis was used to analyse the sunlight distribution in a retail shopping mall. Can Leung, the

project's Senior System Analyst said, "We never thought the application of BIM could be so broad. Since we began using this new technology, we have seen great benefits on a wide range of projects at Scott Wilson."

"Using the BIM software", Jin concluded, "can significantly increase the project productivity. I am really looking forward to applying more of the software's functions on different project elements. There are still many possibilities to be explored!"

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Scott Wilson Group is a global integrated design and engineering consultancy for the built and natural environments with a worldwide network of 80 offices and 6,000 employees. Scott Wilson offers Strategic Consultancy and multi-disciplinary professional services in the Railways, Buildings & Infrastructure, Environment and Natural Resources and Roads Sectors.

Actively present in Hong Kong since 1952, Scott Wilson offers core strengths in the planning, design and construction supervision of large-scale transport and urban infrastructure, buildings for property developers, Government clients and contractors. Scott Wilson's key regions are UK, Asia-Pacific, Europe, India and the Middle East, with regional centres in London, Hong Kong, Warsaw, New Delhi and Bahrain/Dubai.

In China, Scott Wilson has over 850 staff in 10 offices in Hong Kong, Beijing, Tianjin, Shanghai, Nanjing, Wuxi, Chongqing, Qingdao, Guangzhou and Shenzhen.