

# Arts Queensland Cultural Centre - using Digital solutions to safeguard our national treasures.

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**Key words:** Engineering survey; Laser scanning; Risk management; Urban renewal

## SUMMARY

3D spatial data is fundamental to understanding the effects of the natural environment on the built environment and the wider community. As part of a flood study commission, Jacobs sought to utilize its in-house Digital Solutions team to provide the essential data and analysis needed to understand this complex site and its proximity to the Brisbane River when in flood. □ The precinct is complex, multi-levelled, and interconnected through subterranean buildings, tunnels, and carparks. When you add a large underground utility network closely related to the Brisbane River, it was important to develop a data capture method that enabled the entire precinct to be digitally modelled, visualized, and virtual scenario planning performed upon. □ 3D laser scanning, utilizing both terrestrial and aerial platforms, was integrated to form a fully homogeneous and integrated survey-accurate point cloud. This enabled the 3D modelling of public spaces and buildings, along with critical operational infrastructure. The complete point cloud formed a foundational dataset for the creation of building models and room geometries to input into flood modelling software, enabling the complex interconnectivity of the buildings within the precinct and surrounding local community to be fully understood for the first time. □ Key to understanding the effects of flood on the South Bank was the role the underground utilities play when the Brisbane River is in flood. By utilizing GPR, 3D scanning, and robotic cameras, the team was able to trace and confirm the current location, connectivity, and size of utilities. Custom FME scripts were developed to take field-captured data and output 3D solid models of pits, chambers, and pipes. This provided a workflow that was quick, repeatable, and output spatial formats that allowed the project team and stakeholders to visually understand the role the river, utilities, and built environment have on each other. □ Pointerra was utilized by the project team to visualize the 3D point cloud data of the precinct and share it between design and AQ project teams. All modelled utilities were imported into Pointerra, which quickly allowed the teams to visualize underground networks and understand the flood challenges throughout the precinct. □ Before this project was commissioned, little was

known about the utility network and the role it plays during a flood event, and the effect it has on the AQ precinct, South Bank community, heritage-listed public buildings, and internationally important works of art. As a result of this project, flood engineering solutions are currently being developed that target previously unknown sources of flood ingress and water movement, and the relocation of key operational assets to areas with greater reliability of operation. □ This project will have huge benefits for the South Bank community and the wider national community that utilizes this nationally significant site and its public arts. While large flood events will not be prevented, the Arts Queensland precinct is now better equipped and in a more resilient position to respond to future flooding events and mitigate the damage and long reopening times previously encountered. □

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FIG Working Week 2025  
Collaboration, Innovation and Resilience: Championing a Digital Generation  
Brisbane, Australia, 6–10 April 2025