

CALLIDE DAM GATE MAINTENANCE PROJECT

CASE STUDY



THE BACKGROUND

The Callide Dam is one of two zoned earth-fill embankment dams that comprise the Callide Valley Scheme. The scheme, owned and operated by SunWater, provides water supply to support major industries in the Banana Shire of central Queensland, Australia.

The project required developing risk-informed dam safety solutions to mitigate gate vibration during operations, which had been causing structural damage. Thorough site inspections and assessments were needed to gain a better understanding of the short-term and long-term risks associated with the dam gate vibration.

Holovision was initially engaged to deliver a solution to enable virtual site inspections. The solution consisted of capturing high-definition images and laser scan-point cloud data, which was accessed by engineers via a cloud-based viewing system.

Our team of surveyors also performed survey and remote monitoring during the testing phase, assisting with the analysis and operational assessment of the gates.



Client

Engenium (now Stantec) for Sunwater

Location

Callide Dam, Callide, QLD

Sector

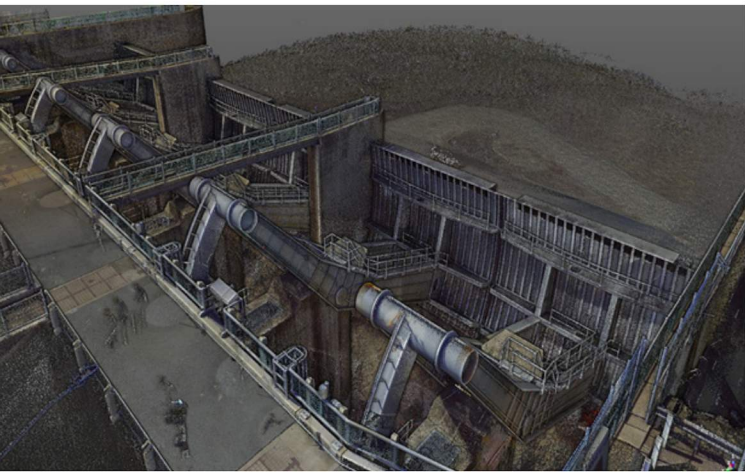
Water Infrastructure

Services

- Laser Scanning
- Monitoring Survey
- Digital Visualisation

CHALLENGES

- Callide Dam is in a remote location, meaning regular site visits by project stakeholders would have been time-consuming and costly.
- As close to 100% coverage of the site was required for weld inspection, the glaring sun exposure over the whole site made capturing quality imagery difficult.
- Traditional methods for documenting the condition of a site of this scale would be time-consuming and impractical, resulting in a report containing thousands of images requiring interpretation to confirm each image's location.
- Much of the dam structure is inaccessible without an EWP; images were required >17m from the spillway surface.
- Measuring the incremental counterweigh movements required high levels of accuracy, integration of multiple synchronised measuring devices and collaboration with the crane operator.

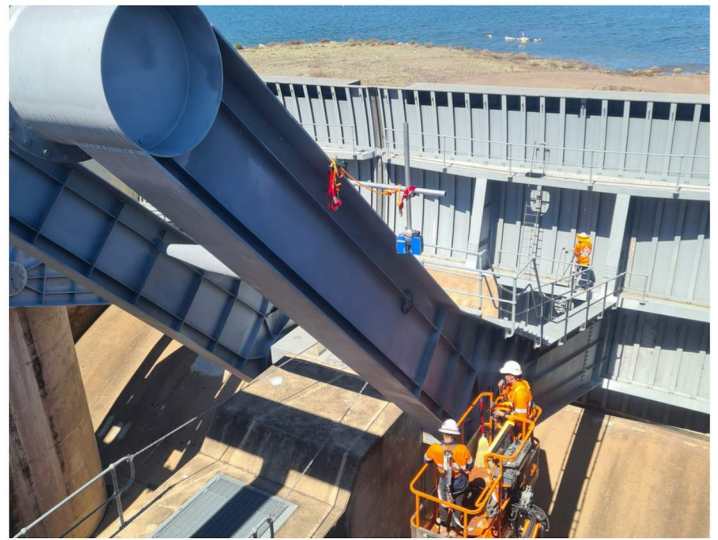


SCANNING SOLUTIONS

- Prior to commencing the job, our team studied the site to ascertain the best access and scanning methods to ensure the scope was achievable and the client's needs were met. Custom brackets and magnetic mounts were designed to fix our laser scanners to the steel structure in vertical, horizontal, and inverted positions, complete with a fall restraint system.
- 1000+ individual scans of the site were captured, with only a quarter allowing for standard tripod mounting.
- Our in-house drone pilot took detailed aerial images in both automated and manual modes assisting with project planning and inspection.

SURVEYING SOLUTIONS

- Our survey team later returned during testing to monitor the gates' operational movement, and remotely measure the gate opening distance. This required a bespoke solution composed of engineering, reconnaissance, and terrestrial survey techniques.
- Survey techniques were used to monitor and track the testing to ascertain what was causing the steel gates to open differently and buckle.
- We used various survey tools to measure the heights of the gates, and their counterweights as the manual and automatic testing took place, helping determine the cause of the issue.
- HoloVision's R&D department created a method of extracting distance measurements from image and video recording, helping to collate the data from multiple devices in a format allowing time-stamp comparison with sensing devices.



BENEFITS TO CLIENTS

- The client was able to perform site and weld inspections virtually using VR devices from offsite.
- We provided the necessary level of accuracy required to enable a detailed analysis of the structure's condition and operations.
- Data enabled the validation of original design drawings and formed a base for an as-built model to be developed.
- Rich spatial data proved useful for analysis of gate arms' dimensional and positional status, and analysis of counterweights chambers without the need to physically access them. It can also be used for future remanufacturing of steel components if failure occurs.