

# Paradise Dam Essential Works

## Fact Sheet: Geotechnical Investigations

**October 2020**

### **Background**

Strengthening and stabilising work is required as part of the long-term remediation of Paradise Dam. The options to achieve this include large post tensioned anchors, or alternatively mass concrete buttressing (widening the base of the dam and increasing the wall thickness by mass concrete) or a combination of the two, amongst other improvement works.

These options require further design development, options assessment, and will need several years of construction to implement.

In parallel with the Essential Works to lower the primary spillway to reduce the risk of a dam failure, Sunwater is undertaking geotechnical investigations including:

- development of a 3D geological model; and
- geotechnical assessment of the dam foundations.

Anchor trials to determine whether anchoring can be an effective solution to stabilise and strengthen Paradise Dam, and sampling and testing of the roller compacted concrete (RCC) are also being conducted. The results of these three investigations, together with a detailed water demand assessment, will influence the long-term remediation design for Paradise Dam.

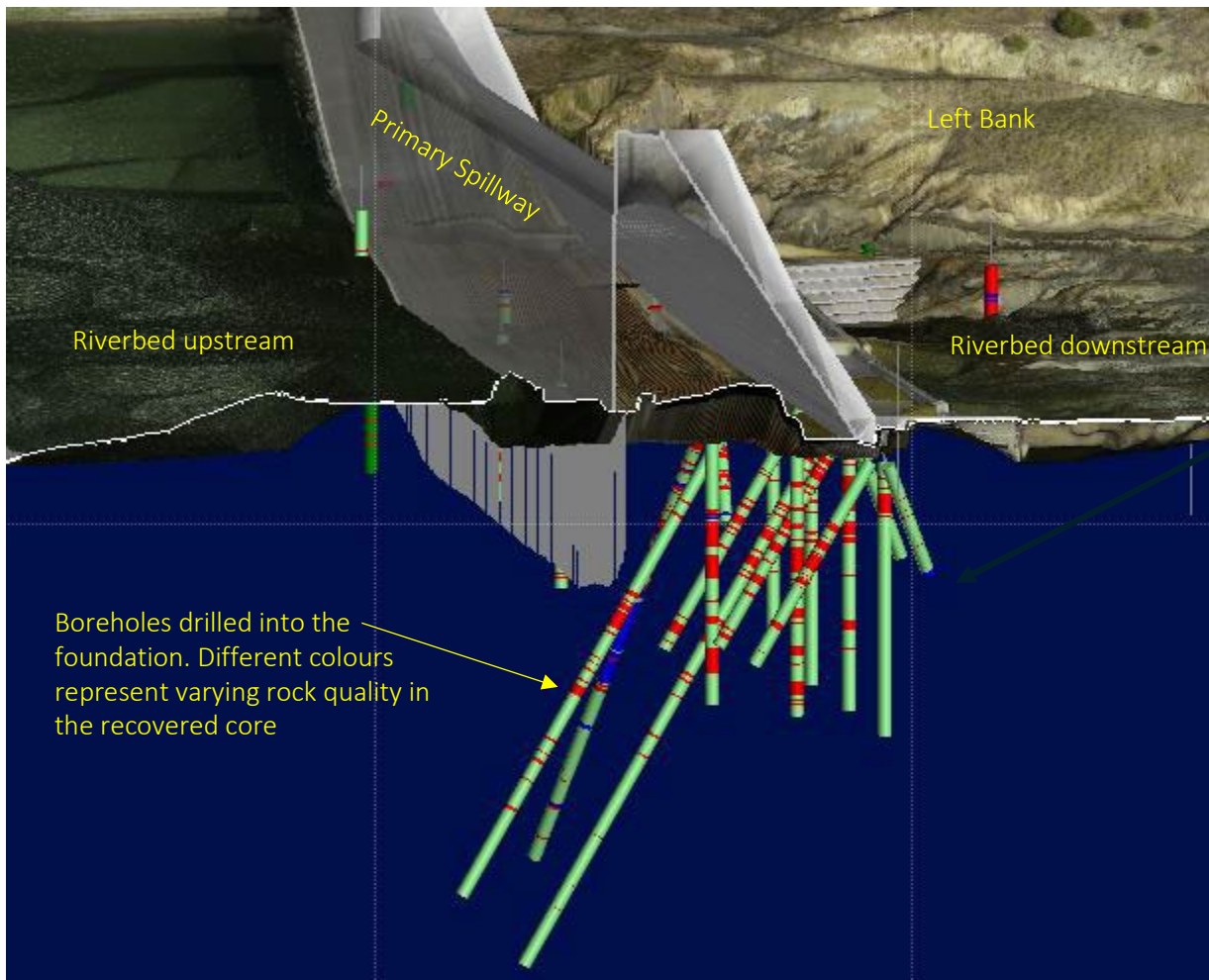
### **What is a 3D geological model?**

A three-dimensional (3D) geological model collates all available geological and geotechnical information to gain a thorough understanding of the dam's foundation conditions.

Geological information relates to soil and rock types and their characteristics.

Geotechnical information relates to the study of soil and rock from an engineering perspective.

The Paradise Dam geological model was built from initial pre-construction and post-construction investigations following the 2011 and 2013 flood events. A simplified snapshot of the Paradise Dam 3D geological model is shown in Figure 1.



*Figure 1 - Paradise Dam Geological Model showing dam in section with borehole rock quality assessment*

### **Who is undertaking this work?**

In 2018 GHD was engaged to review and collate the geological information for Paradise Dam into a three-dimensional (3D) model to provide a broad geological layout of the foundation. This was to aid the preliminary design and scoping of further geotechnical investigations to support the business case being undertaken at the time. The 3D geological model presented the main geological formations, previous geotechnical investigations and a simplified interpretation of geological structures within the dam foundation.

During 2019 SMEC undertook additional geotechnical field investigations which GHD subsequently incorporated into the 3D model.

The model now includes:

- a structural (geology) foundation model;
- updated geotechnical properties of the dam foundation; and
- geotechnical parameters for use in dam stability assessment, scour assessment and preliminary design work.

Foundation stability analysis can now be undertaken to inform potential remediation measures.

### **What will the results influence?**

The geological assessment of the dam foundations influences dam stability assessment, scour assessment and ultimately dam remediation measures.

An updated foundation stability analysis will be undertaken during this phase of design to inform the remediation measures required to bring the dam back into alignment with societal risk expectations, and ANCOLD guidelines for this structure.

The extent of riverbed protection required immediately downstream of Paradise Dam and the amount of post-tensioned anchoring or buttressing required to strengthen the dam structure itself will be informed by the results of the geotechnical investigations.

### **Timing and results**

The 3D geological model and Geotechnical Interpretive report have been finalised. The foundation stability analysis will be undertaken in coming months to inform engineering design of potential remediation options for Paradise Dam.

Results are anticipated to be available to provide to Building Queensland in early 2021 to facilitate the further evaluation of options for the long-term future of Paradise Dam.

### **Stakeholder engagement**

Sunwater is committed to ongoing stakeholder engagement to ensure there is transparency of the engineering testing. We will share progress updates as the work progresses and results become available.

### **Questions?**

Please contact us on 3120 0270 or [paradise.dam@sunwater.com.au](mailto:paradise.dam@sunwater.com.au) with any questions.