

Project: Deep Stream Hydro Scheme

Client: TrustPower Limited

Location: Otago District

Date: 2006-2008

The TrustPower Deep Stream Hydro Project utilises the 310m elevation difference between the existing pipeline diverting water from Deep Stream and Lake Mahinerangi (the principal storage for the Waipori Scheme near Dunedin). The scheme includes two power stations, a storage lake and conveyance systems involving canals, penstocks, and associated structures. Principal water retaining structures include:

- ❖ main dam, 25m height, retaining a reservoir of just under two million cubic metres stored volume at full supply level;
- ❖ saddle dam 9m height;
- ❖ 8km of canal, incorporating Dam 'C', about 8m high.

The main dam provides supplementary water storage for Dunedin City in drought conditions.

Both dams are founded on schist bedrock; in the case of the main dam, 2.5m to 3m of soft organic soils were removed in the stream valley. Some key features of the design include:

- ❖ dam cross section incorporates a silt core (colluvial/residual soil) with schist rockfill shoulders;
- ❖ vertical chimney drain;
- ❖ foundation cutoff into moderately weathered rock;
- ❖ three layer blanket drain in the valley section, with a series of strip drains on the abutments;
- ❖ toe cutoff drain;
- ❖ batter slopes 1:2 downstream, 1:2.75 upstream.

The bedrock foundations, as exposed, were generally in line with expectations; occasional defects such as thin weathered seams have been treated with dental concrete. Grouting was not necessary.

The catchment to the dam is modest (70ha). A combined service and emergency spillway is provided on the true left of the main dam. The gated outlet structure to the canal during everyday operation will tend to minimise utilisation of the spillway. A 5m high coffer dam upstream of the main dam, in conjunction with temporary diversion pipes, provided flood protection during construction.

