

Karapiro.—Efficiency tests for Karapiro were completed. This work included the design of the special equipment required.

Waitaki.—Examination and report of schemes for extension of Waitaki has also been made.

Various.—Design of details connected with Karapiro, Waikaremoana, Mangahao, Highbank, and Coleridge has also been undertaken during the year.

Lake-control Schemes

Pukaki.—The designs for Pukaki Lake control scheme were completed.

Tekapo.—A start was made on the design of a dam for Tekapo.

Substations

Major Substations.—The designs for three major substations required for the 220 kV. system at Bunnythorpe, Otahuhu, and Haywards were commenced during the year and for the first two of these are well advanced.

Minor Substations.—The designs for five smaller substations were completed together with those for many lesser works of extension and alteration connected with the Hydro-electric works.

CONSTRUCTION

Maracetai.—During the past year the 25-ft.-diameter diversion tunnel was completed and all preparations for the diversion of the Waikato River have been made. The work during the year on this tunnel involved the excavation to full size of a length of 800 ft., the placing of 1,100 ft. length of arched concrete lining, and the placing of the invert concrete for the whole length of 1,700 ft. Tunnelling-conditions remained difficult because of the inflow of water into the tunnel. This flow remained fairly constant throughout the year (7,000 g.p.m. at the outlet end and 1,500 g.p.m. at the inlet end).

The diversion tunnel gate shaft was concrete lined and the 40-ton diversion tunnel gate and frame installed.

The barrier at the inlet end of the tunnel has been blown up and dragged clear with the diversion tunnel gate in place and closed.

Further excavation has been done on the sloping leg of the spillway tunnel, and the arched portion of the tunnel cross-section has been concrete lined for a distance of about 100 ft.

Excavation for the main piers at the spillway intake has been completed.

Grouting has been continued on the left bank grout curtain. This work was held up for some time when the drilling rigs were shifted to enable "box grouting" to be done. This comprises the drilling and grouting to below present river-level of a box-shaped curtain enclosing the area to be dewatered for dam and power-house construction. The "box-grouting" is now 90 per cent. completed.

Holes have been drilled in the area of the right bank grout curtain to investigate the rock at depth.

Excavation for both the right and left abutments of the dam above river-level has been completed, and diversion of the river will permit the remaining excavation to be carried out.

The lift shaft and adits have been concreted, and the lift installed and tested.

The tracks for the two overhead $7\frac{1}{2}$ -ton cableways have been completed and the towers erected.

The steelwork of the concrete plant has been erected and the shell of the cement silo completed. The aggregate-conveyor is in course of construction. A mast and drag-line for dragging the river-bed has been erected.

The aggregate-crushing plant located at Whakamaru has been 75 per cent. completed.