

penstocks. The second contract continued on from this point through the powerhouse, turbines, electrical generators, transformers, switching-gear to the main outgoing feeders, and including all the innumerable auxiliaries necessary to produce a complete plant in going order. The contracts laid it down that preference would be given to any firm tendering for both contracts, as the absence of friction between two contractors whose interests would not have been coincident, and whose works would have to be co-ordinated, and the saving in supervision, would have justified the payment of a higher sum in order to get the work let to one contractor. However, the Department was fortunate in that a satisfactory tender by a British firm for both contracts was very considerably less than any other combination. The successful tenderers were Messrs. Sir W. G. Armstrong, Whitworth, and Co., and the price £1,170,991 13s. 8d.

One of the conditions of the contract was that the Department would provide certain access, and the greater part of the work done on the ground by the Department during the past year has been in the direction of providing this access, and preparing accommodation for the Department's staff which will have to supervise the work. The access may be assumed to commence at the Putaruru Railway-station, the nearest point to the works on the existing railway system, and from this point a good metal road is being constructed to the site of the contractors' probable activities on both sides of the river. This involves a very considerable bridge, which must be sufficiently strong to carry 40-ton loads across the Waikato River. The first section from Putaruru, 0 m. to 2 m. 60 ch., has been completed. From 2 m. 60 ch. to 5 m. 30 ch. the road has been trimmed up and the bottom layer of coarse sand has been laid. Owing to non-completion of the Waipa Bridge, due to difficulty in procuring hardwood, no shingle could be laid on this length before the weather broke at the beginning of winter, and little could be done since on account of the continuous bad weather, and, as a result, portions of this length are now in bad order. Five motor-trucks and a number of teams are at present at work, and, given a month's reasonable weather, will soon make good the damage.

The third section, from 5 m. 20 ch. to 8 m. 50 ch., has been completed, and the remaining 1 mile 4 chains to the dam-site has been sanded, and is now ready for the shingle. The bridge itself was constructed in the Department's workshop at Tauranga at a price considerably below that of the lowest public tender, and in less than contract time.

Piers and abutments, which are of concrete, are now in hand, all the excavation being completed, and the large pier on the east bank being also concreted. In order to facilitate this work a 2-ton cableway was erected, and is being utilized also for transporting men and material from bank to bank. On the farther side of the river the portion of the road from the Waikato Bridge to the head-race bridge-site is partly completed, but has been delayed owing to the failure of the contractor. The piers of the bridge over the head-race (which will become the Waikato River) are proceeding satisfactorily, and the foundations will shortly be completed. The bridge will consist of four 40 ft. rolled-steel joist spans on concrete and timber piers. The principal material for the superstructure is on the ground. From the head-race bridge to the point where the new roads join the existing Pukeatua Road the formation is practically completed, and 35 chains have been sanded. In addition, 22 chains of shingle has been done on the finished portion of the abandoned contract between the two bridges referred to above. The fencing of the main access road on the right bank to the camp reserve is now finished.

Throughout the year investigations were carried out in considerable detail, both on the Maungatautari Mountain and along the Waikato River, in order to try and find a more favourable quarry-site than the one which was referred to in the contract specifications, and on which the tenders were to be based. In spite of several very hopeful clues, however, nothing better could be found than the deposit at Muku Creek on which the contractors were asked to tender.

The permanent-village site was fenced, cleared, and sown in grass. The main street was formed and metalled. Four permanent cottages and the main Public Works office were erected. A high-tension transmission-line was carried from Horahora to Arapuni, from which power is being obtained in connection with the works referred to above, and from which the lighting and heating for the village-site and buildings are being obtained.

During the year various small surveys in connection with the proposed bridge-sites, land boundaries, &c., together with two hydrographical surveys, were completed.

On the main access road referred to above, bridges were erected at 2 m. 50 ch., 3 m. 29 ch., 5 m. 29 ch., and another at 7 m. 63 ch. is almost completed. All the bridges on this road are special, being practically as strong as railway-bridges, owing to the very heavy loads that will have to be transported in connection with the power-house and other machinery.

HORAHORA.

The principal work carried out during the year has been the erection of the new power-house extension and installation of machinery, the deepening of the tail-race, and the investigation regarding the permanent weir. The excavation of the power-house site was carried out by means of power excavators and trucks, this work being carried out simultaneously with the completion of the head-race and tail-race walls and the underpinning of the old power-house on the side adjacent to the extensions. The concreting of the power-house has now been completed with the exception of 4 ft. at the top of the down-stream wall. The work of building this power-house was more than usually difficult, owing to the somewhat intricate nature of the boxing, for the draught-tubes particularly. A difficulty was experienced in the excavation of the tail-race owing to a leakage from the old tail-race, which is only separated by a comparatively thin division. A total of 5,123 cubic yards of concrete was placed.

Castings and machinery for one complete unit have been transported from Hinuera Railway-station, a distance of eleven miles, over exceptionally bad roads. Foundation castings for one turbine are now in position, and the work of assembling is going ahead smoothly.