

being secured by heavy strutting as the work proceeds. This central coffer-dam, secured by its enclosed section of the permanent work, will in turn furnish the starting-point for both the Canterbury and Otago coffer-dams.

Excavation for the power-house section of the dam has been begun, as also has excavation for the abutment of the dam against the hills on the Canterbury side. A deviation of the main road, $1\frac{1}{2}$ m. long, has been completed and put into use.

A complete construction plant is already installed or is arranged for. The plant in use includes steam-locomotives, several pile-driving plants, derricks, cranes, air-compressing plants, &c. Plant for concrete-mixing purposes, including bins, is under erection.

Three shifts are employed on the river work, and two shifts on some of the other excavation. At the end of June 332 men were employed on the works.

RIVER IMPROVEMENT AND PROTECTIVE WORKS.

WAIROA RIVER.

Tokatoka Stop-banks.—The work of protecting the foreshore of the Wairoa River against tidal and wave erosion, with consequent destruction of the stop-banks, made some small progress this year, 1,373 cub. yd. of rock spalls being placed on the foreshore, including a length of 25 ch. of the Awaroa Stream. 87 ch. of drain were cut between Wallace Road and Creamery Road, and a culvert, 36 ft. long, of 4-ft.-diameter pipes was laid under Creamery Road.

WAIHOU AND OHINEMURI RIVERS IMPROVEMENT.

During the past year almost the whole work done was on the Lower Waihou River, and that lower end of the scheme is now substantially completed. A summary of the work done there is as follows: Stop-banks constructed by suction dredges, 2 m. 60 ch.; lighter sections of stop-banks constructed by co-operative contract, 2 m. 70 ch.; soiling stop-banks by use of Ruston drag-line excavators, 6 m. 71 ch.; filling borrow-pits and clearing beams by use of Ruston drag-line excavators, 3 m. 48 ch. Ten culverts, with flood-gates, sizes ranging from 12 in. to 4 ft. diameter, have been built. Road-reconstruction over a length of 80 ch., necessitated by construction of stop-bank, has been done.

On various major drains 5 m. 40 ch. of widening, deepening, and making batters has been done by drag-line specially bought for this class of work. 2 m. 40 ch. of drain has been enlarged by hand. Willow-clearing and willow-ringbarking have been carried out on a considerable scale. Other miscellaneous jobs have been carried out on various parts of the stop-bank system.

As a result of the major flood in July of last year, the stop-bank was breached at Rotokohu. The flood indicated that considerable seepage is liable to take place through the sand-core bank on the Upper Waihou. Arrangements are in hand for strengthening the Upper Waihou stop-banks against this risk by building a banquette on to the existing bank. This work will be undertaken during this year by using the Ruston drag-lines.

Generally the works have been adequately maintained, and the considerable plant in use has been kept in good condition.

TAIERI RIVER.

With the exception of work required to improve the operation of the contour channel, the construction work on the Taieri River flood-protection scheme is in its final stages. The main stop-bank is completed, except for raising and strengthening its continuation along the left bank of the contour channel, this latter work being in hand.

The pumping-station located in the main stop-bank alongside Waipori Lake has been completed. During construction some trouble with foundations was experienced. This was overcome, and extra sheet piling was driven across the line of the building, and concrete rafts laid down in inlet and outlet canals to stop water-seepage under or around the building. The equipment, consisting of three low-lift motor-driven pumps with necessary accessories, capable of handling approximately 80 cub. ft. of water per second each, has been erected, and on test satisfactorily stood up to makers' guarantee. The pumping-station is now in service, and, with the necessary system of feeding drains, constitutes a most valuable portion of the scheme, and will greatly enhance the value of the lower portion of the Taieri Plain.

Of the drainage system, 3 m. 61 ch. of the main drain is complete, save for bars or breaks left till the pumping-station and feeding-canal is complete, 80,000 cub. yd. being excavated from this during the year by Ruston drag-line, the remaining length of 60 ch. through Maori Lake being now in hand. Wain's drain, involving 32,000 cub. yd. of excavation, has also been dug with the Ruston drag-line. Wain's drain culvert-box under main stop-bank is in hand. Two road-bridges and four private bridges were built over main drain, bridges being single-span steel-joist structures of about 35 ft. length.

The contour-channel road-bridge (length, 200 ft.), a hardwood-timber structure on piled piers, has been completed. The Otokia Railway-bridge has been lengthened 400 ft. to provide additional waterway, the extension being in 40-ft.-span steel-plate girders, through type, on ironbark-pile piers. The removing of the old railway-bank under the bridge-extension is in hand.

The contour channel has always been unsatisfactory, in that it is impossible at cost within reason to give it sufficient capacity to carry all waters that flow to it. In the past the overflowing waters have breached the contour-channel banks in innumerable places, thus causing uncontrolled and expensive flooding. A scheme has been got out to provide definite spillways to give relief to the channel and prevent it breaching its banks, the spillway of flood-waters thus being restricted to short periods during the peak of floods. This scheme is now being submitted to the Taieri River Trust for its concurrence before steps are taken to put it in hand.