

The principal work proposed for the ensuing year is the widening of the Whangatane spillway, for which plant has been procured. Some outlet drains require enlarging to more effectively deal with the flood-waters, and additional flood-gate outlets have to be installed in the tidal area.

Works Expenditure.—The amount expended during the year was £10,699 17s. 10d., of which the principal items were—day labour, £5,196 13s. 8d.; and piecework contracts, £2,479 12s. 11d.

A graph is attached hereto showing the rainfall record at the office gauge at Kaitia, as well as the readings of the gauge in the river at the Waikuruki Bridge (sometimes known as Foster's).

The local officer in charge is Mr. T. S. McMillan.

HIKURANGI DRAINAGE AREA (50,000 ACRES), WHANGAREI COUNTY.

Throughout the year the weather conditions have not been quite so favourable as in former years for the prosecution of the excavation work in the Wairua River, owing to the period of average summer level being considerably shortened by floods in the early summer. Rain fell on 143 days, the total fall for the year being 53·87 in. May was the wettest month, with a fall of 8·30 in. spread over eighteen days, whilst April was the driest, when only 1·34 in. were recorded.

The following is a summary of the operations in hand during the year under review :—

Wairua River Diversions.—The diversions of the river at the rapids at Ruatangata have been concentrated on as far as possible, it being recognized that the lowering of water-level at this point will have a far-reaching effect on the sluggish reaches of the river above. No. 1 diversion has not necessitated any further work during the past twelve months, but the toe of the big slip at the lower end of No. 2 diversion had to be removed. The floods experienced during the winter have removed the clay from the lower portion of the slip, which is now practically a solid face of boulders. There now appears to be very little movement in the slip, and it is hoped that stability has been reached. No. 3 diversion was completed during the year, but in places large stones overlying the pug formation on the bottom have been dislodged from the batters by the winter floods. These will require to be removed before the last machine leaves the locality. It is anticipated that the removal of these obstructions will lower the ordinary water-level in the lagoon immediately above this cut by 2 ft., bringing the level down to 5 ft. above datum. The last diversion in this locality, No. 4, was opened out to the river above just before last winter, but not down to grade level. The river has been running through this cut since that date, but in spite of the excessive fall at this point there has been practically no scouring of the channel. The ordinary water-level in the river above cut No. 4 has fallen to 14·20 ft., which level will be lowered considerably by works now in hand. In order to achieve this object, which affects the river for miles above this point, the construction of further spillways was authorized during the year. The most important is the opening-up of the old bed of the river eliminated by the construction of cut No. 4. This channel has been constructed down to a grade of 9 ft. for a distance of 11½ chains, and this spillway should be completed before June if floods are not experienced. The excavation is completely through rock formation, requiring drilling and blasting. The spoil is then loaded by steam-shovel into trucks of 4 cubic yards capacity, which are hauled out from the face by a Plymouth gasoline locomotive and dumped in No. 1 lagoon. The other spillway authorized in this locality commences at No. 2 lagoon and follows the old river-bed to the upper end of cut No. 2, after which a new channel is to be constructed to the east of cut No. 3, joining lagoon No. 1 at the south-east corner. The lower portion of this channel is through rock country, of which 7 chains has been constructed to date. At the upper end some 4 chains of the new channel has been partially completed. This portion of the excavation will not be so expensive to construct, as the rock has in places dipped below the required grade level. At present excavation is not being carried out at this point, but this work will be taken in hand and pushed on to completion. The cost of this work was approximately £14,200, the amount of spoil excavated being 62,820 cubic yards, of which 75 per cent. was rock, the balance being clay. The unit cost was 4s. 6d. per cubic yard.

Up-stream Diversions.—These diversions have been taken in hand, and Nos. 1, 2, and 3 have been completed, whilst 1b and 4 are in progress. The channels in each case are being constructed to at least 100 ft. on top, with batters of 1 to 1, and bottom level of 10 ft. above datum. The country dredged has varied from soft and hard clay to papa and sand. The drag-lines, equipped with a 50 ft. boom and a ¾-cubic-yard bucket, have been used for this work, but on account of the great depth of excavation—up to 30 ft.—the work is necessarily slow. The amount of spoil excavated on this work was 89,100 cubic yards, at a total cost of £3,310, the unit cost being 9·1d.

Ngararatunua Canal, Block IV, Purua Survey District.—The excavation of this cut has been continued by dredge No. 3 (Priestman), which has completed a further 121 chains, the spoil dredged amounting to 62,675 cubic yards, at a unit cost of 9·27d. The country has generally been particularly hard, which has caused the costs to be higher than during the previous year. The excavation of this cut should be completed during the coming year, and will give improved drainage to an area of about 4,000 acres of swamp country.

Surveys.—When weather conditions permitted, levels were taken over the swamp areas, commencing from the southern end, and from the data obtained the preliminary location of the channels necessary to give relief from internal flooding was fixed. The location of these channels is shown on the accompanying lithograph. Several surveys in conjunction with borings were carried out along the Wairua River with the object of endeavouring to avoid the removal of rock bars, but in some cases these bars extend across the line of the proposed diversion, in which case it is advisable to remove the rock from the river itself. These surveys will be extended, and, as occasion demands, the final location will be completed.

Plant and Machinery.—The excavating plant on the works consists of three Bucyrus caterpillar machines, convertible to either drag-line or steam-shovel, as well as one floating Priestman dredge. These machines have been kept in repair, as far as possible, by work carried out at the shop on the works, but heavy repairs must of necessity be sent out to private shops. One drag-line was completely