

1920.  
NEW ZEALAND.

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DEPARTMENT OF LANDS AND SURVEY:

# RANGITAIKI LAND DRAINAGE.

REPORT FOR THE YEAR ENDED 31st MARCH, 1920, TOGETHER WITH STATEMENT  
OF ACCOUNTS.

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*Presented to both Houses of the General Assembly pursuant to Section 10 of the Rangitaiki Land Drainage Act, 1910.*

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SIR,—

Department of Lands and Survey, Wellington, 14th July, 1920.

I have the honour to submit herewith the report upon drainage operations in the Rangitaiki Plains for the year ended 31st March, 1920, pursuant to the provisions of the Rangitaiki Land Drainage Act, 1910.

The report of the Chief Drainage Engineer, Mr. J. B. Thompson, is attached hereto, from which it will be seen that good progress has been made with the works during the year, although the scarcity of labour restricted the scope of operations, and most of the land already drained has been subdivided and settled with satisfactory results.

The accompanying statement of cash transactions and balance-sheet shows the financial transactions for the year, and the position of the account as at the 31st March last.

I have, &c.,

The Hon. D. H. Guthrie, Minister of Lands.

T. N. BRODRICK, Under-Secretary.

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## REPORT OF CHIEF DRAINAGE ENGINEER.

SIR,—

In accordance with the provisions of the Rangitaiki Land Drainage Act, 1910, I have the honour to submit my report on the drainage operations for the year ended 31st March, 1920.

The year has been one of marked progress on the Rangitaiki Swamp. More especially is this to be noticed in those districts where the larger properties have been subdivided; here the influx of new settlers, many of them returned soldiers, has shown most satisfactory results, and land which for years has lain idle, chiefly because of the incapacity of single men to deal with the hundreds and sometimes thousands of acres they own, has now been drained, cleared, and sown down in grass and crops. An abundance of "fall" is now available on by far the greater portion of the swamp, and settlers are taking advantage of this to deepen their private drains with very beneficial results.

A considerable amount of widening and deeping of drains has been carried out during the year, and all drains have been cleaned out periodically. Heavy timber was encountered in certain areas, and a considerable amount of explosives was of necessity used in removing same. Two new Priestman dredges have been taken to works and are now being assembled. I am also commissioned to purchase in America suitable up-to-date plant for maintenance of outfalls. These will probably be of "caterpillar" or "walking" type of excavators, as it is desirable to utilise this type for subsequent maintenance. Their arrival will release "grab" dredges for other works.

## EASTERN DISTRICT.

Drainage in this district has been vigorously pushed on during the period, with very satisfactory results. Outfalls were cut on either side of the road from the Tohakawakawa Stream southwards through Section 30 to the southern boundary of Section 38, Rangitaiki Parish, that on the west side being 10 ft. wide and that on the east 16 ft. wide. This lowered the water in this country fully 4 ft., and land which was previously under water is now quite dry. Spoil from these two drains was thrown on centre of road-line, and formation of the road is nearly complete.

The Otarere drain has been widened and deepened from the Te Rahu-Mangaroa outfall southwards to the boundary of Sections 38 and 31, and from it a branch drain has been cut eastwards through Sections 30 and 38. This latter drain is through very soft, peaty country, and the bottom of the drain is continually being pushed up, necessitating fresh excavation to get any depth.

The eastern drain has been deepened considerably from the Kopeopeo outfall southwards, and another drain on the western side of the Eastern Drain Road has been cut from the Kopeopeo outfall to Luxton's Road, spoil being thrown on to road-line for use in formation.

The Western drain has been deepened from the Kopeopeo outfall to Feist's Road, and a contract is now in progress for deepening for another mile and a half southwards.

The Putiki drain, which joins the Kopeopeo outfall where was formerly the big Kuhanui Lagoon, has been widened and deepened to the southern boundary of Section 75.

Reid's central drain has been widened to 16 ft. on top from the Kopeopeo outfall to the southern boundary of Section 81, and from there has been widened to 14 ft. across Section 84. All available fall was taken up through the low country, and if more fall is taken up when the Kopeopeo Canal is deepened there will be no need for a dredge cut up the line of this drain, as formerly proposed.

Starting half-way between the Kopeopeo Canal and the Orini Stream, a drain was cut in a westerly direction from the Kopeopeo deviation to tap a small but fairly deep lagoon in Section 61, and with the emptying of this lagoon all danger of the road across Section 61 being again inundated was removed.

Drainage in the Native Section 28 has been pushed on during the latter portion of the year. The Orini deviation has been considerably widened, and all fall has been taken up in the Kopua drain, besides the width having been doubled. From Section 54 the Orini Stream has been thoroughly cleaned out, straightened as much as possible by cutting off projecting points, and a certain amount of fall taken up, as far as Section 50.

## WESTERN DISTRICT.

A hand-drain along the line of the proposed Omcheu outfall from the Tarawera Cross Road southwards to the Omcheu Adjunct drain was constructed during the period, and the Omcheu and the Omcheu Adjunct drains were both deepened from the Cross Road to their junction.

The Tengaroa drain from its junction with the Omcheu drain has been widened to 14 ft., as far as the main Rotorua Road, and several feet of fall are now being taken up.

The Awaiti Road drain has been cleaned for its entire distance, and deepened from the Tarawera Western drain southwards.

Smith's drain was constructed from the Tarawera Western drain to the Cross Road, and has given great relief to Sections 146 and 147, Matata Parish.

The Awakaponga outfall was thoroughly cleaned and some fall taken up in the last 20 chains where the silt from the Awakaponga Stream had accumulated. From the dredge cut the Awakaponga drain was widened to 18 ft. to the junction with Collins's drain, and all available fall taken up. This drain will again have to be deepened when the outfall is redredged, as the surrounding country will sink a good deal yet; however, very material relief has been afforded by the work already done.

All other drains have been cleaned out periodically and are in good condition.

## PRIESTMAN DREDGES.

The past year has been one of continual difficulty as far as the dredging is concerned. Supplies of coal for the latter half of the period have been very small, and even then the quality supplied was the poorest. For the last few months of the period the dredges have been running on firewood and slack coal mixed, as long as supplies lasted, but both dredges have been laid up for a time, when repairs to machinery and general overhaul were undertaken. Added to this hard dredging country has been encountered, and consequently the output this year is smaller than that of last year.

Towards the end of 1919, a new pontoon for a Priestman dredger was built on the bank of the Tarawera River close to the Rotorua Road, and this was completed and the machinery erected in March. A trial run was given the plant, and everything worked satisfactorily. As soon as the chutes arrive and can be erected (very shortly now) dredging operations will be started on the Tarawera River, where formerly carried on by the Hammond Pony dredge.

On completion of the pontoon for No. 8 dredge the shipwrights were removed to the Tarawera outlet, where another pontoon was commenced.

During the year Priestman No. 3 branched off from the Kopeopeo deviation at the former lagoon in Section 49, Rangitaiki Parish, and dredged up the line of the Western drain deviation to the junction with the Kopeopeo Canal, thence down the Kopeopeo towards the Eastern drain. The dredge shifted a total of 103,950 cubic yards of spoil, representing a distance of some 142½ chains.

Priestman No. 4 proceeded with the Omeheu outfall, but progress was slow, owing primarily to hard country full of timber, and latterly to scarcity of coal. Altogether a distance of 88½ chains was covered, representing a total of 72,722 cubic yards excavated.

The following table shows the total amount excavated, with the cost per cubic yard, for the past eight years:—

				Cubic Yards.	Cost per Cubic Yard.
1912-13	...	...	...	31,486	4.12d.
1913-14	...	...	...	272,370	3.07d.
1914-15	...	...	...	268,760	3.48d.
1915-16	...	...	...	224,740	4.54d.
1916-17	...	...	...	261,751	4.36d.
1917-18	...	...	...	320,614	3.72d.
1918-19	...	...	...	229,659	5.70d.
1919-20	...	...	...	176,672	6.62d.

The cost per cubic yard for this year is rather high, but this is accounted for by the great increase in costs of coal, freights, repairs, material, and wages, the depth of dredging, and slack time during overhauls.

#### WESTERN DRAIN OUTFALL.

Priestman No. 3 commenced this work about the beginning of the period, but, although dredging was hard, fair progress was made. On the dredge tapping the Kopeopeo Canal about 3 ft. more fall was available in the Western drain, and this was taken up by hand labour. The dredge then proceeded down the Kopeopeo Canal towards the Western drain, but slow progress was made owing to a hard belt of very fine sand on the bottom of the cut.

#### OMEHEU OUTFALL.

Comparatively slow progress was made by dredge No. 4 during the year, owing primarily to the hard dredging experienced, and latterly to the scarcity of coal and the poorness of that amount supplied. For the first half of the period a great deal of timber was encountered, entailing the free use of explosives, but the dredge is now in fair country, and should make good progress when coal-supplies are to hand. To give the dredge enough water to float, a dam was erected at the western corner of Section 74, but as soon as the dredge is out in more solid country this dam will be removed, and the lagoon in Section 134A will then disappear.

#### ROADS.

The Rangitaiki River East Bank Road has now been completely formed from the Matata Inland Road to the Whakatane—Te Teko Road, and is open to traffic. Feist's Road has been completed, and there is now a through road from the Rangitaiki River to Awakeri, which is of great service to the settlers, as it is a very short route to the dairy factory.

Side drains have been cut on the Eastern Drain Road from the Kopeopeo Canal, and this road is now half completed.

The road from Section 30G to boundary Sections 38 and 31 has had spoil from drains on either side thrown on to the centre, and now has only to be graded to be ready for traffic.

The length of roads formed, exclusive of the main East Coast Road, is one and three-quarter miles.

#### RAILWAY ROAD.

The Main East Coast Road has been formed and thrown open for traffic from the Awaiti Road to the Rangitaiki River, and the formation of the portion from the Tarawera River to the Awaiti-Paku Stream has been commenced. As regards the portion from the Awakaponga drain to the Tarawera River, this is very soft and wet, and a good deal of sand will be needed for filling in order to secure a solid foundation. The Public Works Department have been approached in this connection, as they have a steam-shovel and a ballast-train working on the railway alongside, and an endeavour is being made to obtain spoil in this manner.

From the Rangitaiki River eastwards drains have been cut on either side of the road and the spoil thrown in the centre for a distance of about 57 chains.

Fencing has been completed from the Tarawera River to the Rangitaiki River, and from the Western drain to Awakeri. The remainder will be done as soon as the necessary material is to hand. This work has been undertaken out of special grant.

#### BRIDGES AND CULVERTS.

The bridge gang has been busily employed during the year, though hampered during the past few months by lack of suitable material. The obtaining of timber is attended with great difficulty. Two pile bridges were erected, one over Seccombe's drain on the Thornton—Matata Road, and the other over the Omeheu outfall on the line of Gow's Road. Five large sill bridges, 16 ft. long, have been erected over various drains, and in addition some thirteen smaller bridges have been erected. Two concrete and three wooden culverts have been made on various roads, and a timber flood-gate with approaches was made on Seccombe's drain.

## STOP-BANKS.

Owing to floods breaking through existing stop-banks on the east side of the Rangitaiki River in Section 58, Matata Parish, it was decided to renew the old bank and raise the height some 2 ft. This work was accordingly put in hand, and up to the end of the period some 100 chains of bank have been completed. A low bend on the west bank of the Rangitaiki was also banked for a distance of some 50 chains. A comprehensive scheme of stop-banking this river will shortly be undertaken in conjunction with the Public Works Department, who will strengthen existing banks to protect the railway-line now being laid across the swamp.

## DRAINS IN OPERATION.

The total length of drains in operation to date is as follows: Dredge cuts, twenty-four miles; main drains, ninety-three miles; road drains, twenty-one miles.

Most of the drains have been enlarged and deepened during the period, and all have been cut and dragged. All drains are now in first-class order.

## WORKSHOP, THORNTON.

A good deal of work of all kinds for the various dredges, launches, &c., employed on the works was put through by the workshop, and much saving in both time and expense is effected by having this shop on the works.

## BUILDINGS.

During the period a four-roomed cottage with out-buildings was erected for the local Engineer, and three one-roomed whares were also built, one for use at headquarters and two for Priestman No. 3 staff. Otherwise the buildings are the same as last year, the total now being twenty-three.

## FLOATING PLANT.

This consists of three Priestman dredges, two ferry-pontoons, snagging-barge, one towing-barge, three oil-launches, and various punts, boats, &c. All plant is in good order with the exception of the Tarawera Ferry punt, which is decaying a good deal. Both ferry-punts are now out of commission, as the Rangitaiki and Tarawera Rivers have been bridged.

## SURVEYS.

The survey staff has been actively engaged during the past year. Survey of the road and railway from Awakaponga to Awakeri is practically complete, and Crown and Native lands from the Rangitaiki outlet to the Tarawera outlet have been subdivided. In addition to this, trial levels in connection with outfall lines and dredge cuts have been taken, and much work of a similar nature carried out. Altogether sixty-five miles of levels were taken during the period.

## SUMMARY.

New outlet drains ... ..	57,045 cubic yards; 230 chains.
Excavation by dredges ... ..	176,672 cubic yards; 7½ miles.
New road drains ... ..	27,023 cubic yards; 4 miles.
Deepening and widening outlet drains...	218,860 cubic yards; 54 miles.
Cleaning outlet drains ... ..	67½ miles.
Roads formed (new ... ..	1¼ miles.
Stop-banks ... ..	2 miles.
Fencing ... ..	8½ miles.
Levels taken ... ..	65 miles.
Pile bridges erected ... ..	2
Sill bridges ... ..	5
Small bridges and culverts ... ..	18
Flood-gate ... ..	1

General improvement and maintenance of existing works, together with numerous other minor services.

## PRINCIPAL WORKS PROPOSED.

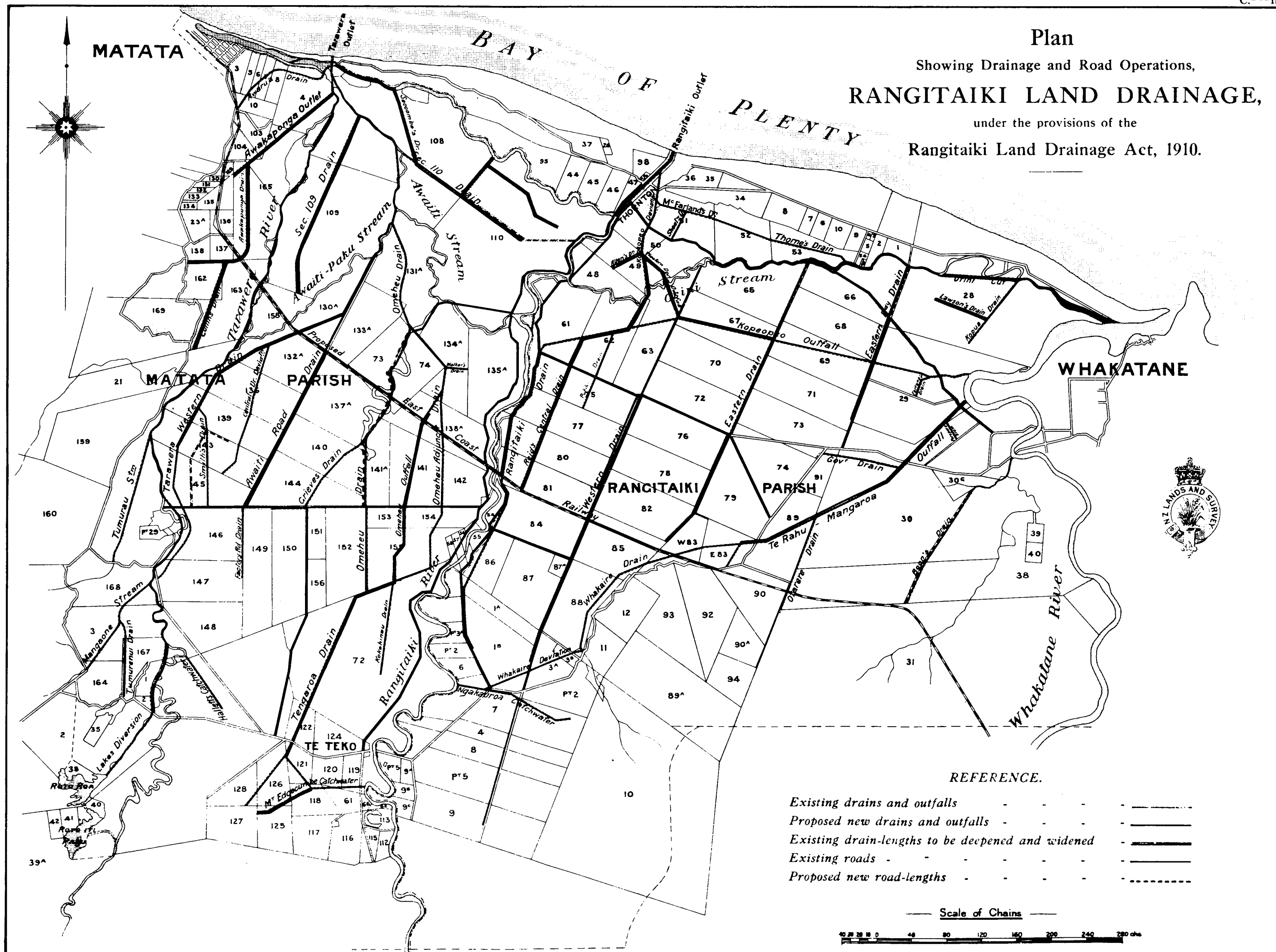
The principal works to be carried out during the next financial year are as follows:—

- (1.) Continuation Omeheu outfall.
- (2.) Redredging Kopeopeo Canal to Eastern drain.
- (3.) Redredging Kopeopeo deviation, and thence up Kopeopeo Canal to Reid's Central drain.
- (4.) Improvement to Orini Stream.
- (5.) Completion of Railway Road.
- (6.) Flood-gate on old Rangitaiki River.
- (7.) Flood-gate on Kopeopeo deviation.
- (8.) New outlet drains and general development-work.

## WORKS EXPENDITURE FOR THE YEAR.

The total amount expended on the works during the year was £59,469 0s. 3d. This includes day labour, piecework, hire of teams, purchase of plant and machinery, supplies and repairs, &c. Of the total amount the sum of £53,910 9s. 3d. was paid out of Imprest Account.

The amount paid out for day labour of all descriptions amounted to £15,767 7s.; piecework, £23,880 17s. 10d.; hire of teams, £2,817 10s. 1d.





## GENERAL.

The vouchers for day labour, contracts, hire of teams are prepared in the local office at Thornton, and are finally dealt with at the Auckland office. All vouchers for purchase of materials and supplies are dealt with in the Auckland office.

I have again to place on record my appreciation of the zealous manner in which the local Engineer, Mr. J. H. Treseder, has performed his duties.

I have, &c.,

J. B. THOMPSON,

Chief Drainage Engineer.

The Under-Secretary for Lands, Wellington.

## RANGITAIKI LAND DRAINAGE ACCOUNT.

## Statement of Transactions during the Year ended 31st March, 1920.

<i>Receipts.</i>			<i>Expenditure.</i>		
	£	s. d.		£	s. d.
Cash in hand at 1st April, 1919 ..	4,379	2 8	Drainage - works, stop - banks, clearing channels, and other expenditure incidental to drainage operations ..	48,142	18 2
Debentures issued under Rangitaiki Land Drainage Act, 1910 ..	105,000	0 0	Management and engineering expenses ..	1,142	16 11
Thirds and fourths ..	12	15 0	Travelling-expenses ..	276	6 9
<i>Rates—</i>	£	s. d.	Interest Account ..	6,349	0 0
Year 1917-18 ..	549	15 10	Compensation for purchase of Native land under section 8 of the Rangitaiki Land Drainage Act ..	219	2 11
„ 1918-19 ..	5,594	7 0	Machinery and plant ..	7,780	6 10
„ 1919-20 ..	183	10 2	Rents credited in error, 1919 ..	10	0 0
	6,327	13 0	Loose tools ..	234	19 7
			Stores ..	1,009	12 1
			Cash in hand, 31st March, 1920 ..	50,754	7 5
	<u>£115,719</u>	<u>10 8</u>		<u>£115,719</u>	<u>10 8</u>

## BALANCE-SHEET.

<i>Liabilities.</i>			<i>Assets.</i>		
	£	s. d.		£	s. d.
Debentures—Rangitaiki Land Drainage Act, 1910 ..	250,000	0 0	Drainage - works—Expenditure in connection therewith, including wages, supplies, administration, engineering expenses, and depreciation of plant ..	181,654	15 11
Consolidated Fund ..	13,422	18 6	Redemption of debentures—Rangitaiki Land Drainage Board ..	2,100	0 0
Unpaid purchase-money—Sundry Natives ..	469	13 1	Interest on Debentures Account ..	9,566	8 4
Suspense Account ..	142	4 4	Land for Settlement Account ..	20	0 0
Loan Redemption Account ..	6,150	12 3	Plant and machinery ..	14,159	8 10
Interest on Investment Account ..	243	4 3	Loose tools ..	381	5 9
			Stores on hand, 31st March, 1920 ..	11	15 0
			Investments—Public Trust Office ..	904	5 4
			Sundry ratepayers ..	10,516	5 10
			Cash in hand, 31st March, 1920 ..	50,754	7 5
	<u>£270,428</u>	<u>12 5</u>		<u>£270,428</u>	<u>12 5</u>

J. H. O'DONNELL, Chief Accountant.

*Approximate Cost of Paper.*—Preparation, not given; printing (600 copies and map), £17 10s.

By Authority: MARCUS F. MARKS, Government Printer, Wellington.—1920.

Price 9d.

