

1920.
NEW ZEALAND.

DEPARTMENT OF LANDS AND SURVEY:
SWAMP DRAINAGE.

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

Presented to both Houses of the General Assembly pursuant to Section 13 of the Swamp Drainage Act, 1915.

SIR,— Department of Lands and Survey, Wellington, 14th July, 1920.
In pursuance of section 13 of the Swamp Drainage Act, 1915, I forward herewith the report of the Chief Drainage Engineer upon the operations carried out under the above Act for the past year, together with a statement of cash transactions and balance-sheet.

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

I have, &c.,

T. N. BRODRICK, Under-Secretary.

REPORT BY CHIEF DRAINAGE ENGINEER.

SIR,—

I have the honour to submit annual reports on the areas proclaimed under the Swamp Drainage Act, 1915.

During the year a new area was proclaimed—viz., Hikurangi Drainage Area.

KAITAIA DRAINAGE AREA (39,665 acres).

General.—Progress has been exceptionally marked during the year, advantage having been taken of the plentiful supply of labour offering in the district. Climatic conditions generally have also assisted, as there was a good summer and a mild winter. The rainfall recorded by the departmental gauge for the year was 31.71 in., the greatest fall for any month being during July, when the fall was 7.37 in. Although several very heavy falls have been experienced, and the carrying-powers of the river-channel greatly taxed, it is noteworthy to record that at no period have the Kaitaia flats been under water, though previously a smaller fall would have caused considerable inundation. Freshes which ordinarily took three days to reach Awanui now only take a few hours. We have kept in touch with rainfall records over other portions of the watershed, and taken note of the flooding from various portions of the river-source. The lake has been very high during the greater part of the year, and has carried a large amount of flood-water.

River-diversions and Spillway Cuttings.—The three cuttings on the main river remaining at 31st March, 1919, have been taken down to an average depth of 5½ ft., thus completing all river-diversion work between Awanui and Kaitaia, and all cuttings on Whangatane spillway are now constructed between Kaitaia and California Swamp. The work has been done by wheel scoops, and, with the exception of two cuts done by contract, all work has been done by day labour. The work has been economically performed, clay work averaging 1s. 5d. per yard. Total yardage removed during the year was 47,700 cubic yards.

Roads and Drains.—A great stride has been made during the year with party drains and main outfalls, and with the exception of a few minor drains the entire stretch from Ahipara to Waipapakauri is now completed.

Ahipara and Pukepoto.—All outfalls are now constructed and all main streams tapped. A few drains remain to be done in the Native subdivisions, and the main road has yet to be constructed from Kaitaia through Lake Tongongoe. Outfalls for this road are already constructed, and the road will be taken in hand during the coming winter.

Crown Land.—Main outfalls have been constructed as far as possible along the road-lines. All road-banks are now thrown up out of drain spoil, and only a small foothill drain remains to be laid off to complete the entire block. This has brought in some 2,760 acres.

Waipapakauri.—During the year a start was made at Waipapakauri, and the main outfall started. This has been for nearly half its distance through fairly heavy timber, and progress has been comparatively slow. This drain has, however, brought in a large area and will be one of our most useful drains, cutting off a large portion of the swamp hitherto unsuccessfully drained into the river and now discharging into the Waipapakauri Creek. An outfall was brought up from Waimanone Creek, and this also cuts off a considerable area previously drained into the Awanui River. All road-drain work has been completed to the north boundary of Section 6, and the remainder of the work—to the north boundary of Crown land—will be carried out within the next few months, thus completing the road stretch from Ahipara to Waipapakauri.

Roads to Crown Land.—That road via wireless station will be taken in hand during the winter. Outfall for these roads is being brought up from lagoon in O.L.C. 193, through kahikatea swamp, and should be completed during the winter. A drain has been opened up on the line of the spillway through the California Swamp, tapping the Oinu Stream. In consequence of this the outfall drain along the line of the spillway to Pairatahi Creek has had to be widened and cleaned. California Creek was snagged, and willows removed, and this will be widened and stop-banked during the winter.

During the latter portion of the year the greater part of the drain and road work has been done by piecework contract, and, with a few exceptions, has been done in a high-class manner and at a reasonable cost.

The total road chainage completed during the year is as follows:—

	Roads (Double Drains).		Drains.	
	M.	ch.	M.	ch.
Ahipara and Pukepoto	0	38	10	30
Crown land	7	18½	18	18
Waipapakauri	1	49	8	11
California			1	32½
	9	25½	38	11½

Dredging of River.—The Priestman dredge was erected during the year, and started cutting in September. Since then progress has been slow owing to high banks and large quantities of sand. Some 45 chains of river has been dredged, including one cutting of 3 chains. Owing to the low water-level during summer it has been necessary to dam the river. Yardage removed by dredge, 21,200 cubic yards.

Surveys.—During the year a large amount of new country has been dealt with. The subdivision of Crown land was begun during March of the previous year, and all main roads and outfalls ranged according to scheme of subdivision. Many new traverses were run, and bearings re-established from trigs. Levels of all roads have been taken and bench-marks established.

New access roads from Waipapakauri to Crown land have been surveyed and levelled, and old blocks in the vicinity of Waipapakauri and Waimanone redefined. Many of the old surveys are defective, and in many cases no trace of former surveys remain. Some 1,200 acres around the lake were levelled, and roads located during the summer. Towards the end of the year traverses were run round the mangrove flats from Waipapakauri and Waimanone to Pairatahi and Mangatete, for stop-banking against tides, and a traverse made of Awanui River from Awanui landing to mouth of river for navigation purposes.

Works Expenditure for the Year.—The total expenditure for the year was £29,522 3s. 1d. including wages, piecework contracts, supplies, hire of teams, and general expenses. Of this amount the sum of £27,567 12s. 11d. was paid out of Kaitia Imprest Account for wages, piecework contracts, &c. The principal payments were—day labour, £19,373 14s. 8d.; piecework contracts, £4,035 17s. 1d.; hire of teams, £2,924 1s. 1d.

General.—Mr. R. J. Cornwell is in local charge of operations, and has ably carried out his duties during the period under review.

Vouchers, &c., are prepared in the Auckland Office, where the books in connection with the works are kept.

WAIHI DRAINAGE AREA (22,720 acres).

The work on this area has practically been confined to the dredging of the Wairere Stream, which is the main outlet through the Crown portion of the area. During the year the dredge removed 44,250 cubic yards of spoil, at a total cost of £1,713 11s. 1d., averaging 9'29d. per cubic yard. The surface digging was good, but after 2 ft. a layer of sand and shell was encountered, which was extremely difficult to remove. During the latter end of the period the dredge was overhauled, and is now in good order.

Until the dredge has excavated another half mile of the Wairere Stream it will be impossible to do any hand labour. This should be possible by next summer, and then the development of the area will be much more rapid. More plant for excavating large channels is urgently required on this area, as one dredge cannot cope with the work. In addition to the dredging the following work was carried out: 70 chains clearing drains, and 65 chains removing timber from the Kaikokopu Stream, above the main road.

Expenditure for the Year.—The total expenditure for the year was £1,982 14s. 2d., day labour absorbing £890 13s. 4d. The wages-sheets are prepared in the Auckland Office, where the accounts are prepared for payment.

POUKAWA LAKE DRAINAGE AREA (13,567 acres).

This work has again been in abeyance owing to the difficulty of coming to any satisfactory arrangements with the Native owners of the Poukawa Reserve.

The plant and buildings are in charge of a caretaker, who takes a daily reading of the rainfall and of the rise and fall in the Poukawa Lake level.

The plant consists of a pontoon, which is in good order and is ready when the machinery is available. The buildings comprise office, cookhouse, workmen's quarters, and toolhouse, all of which are also in good order.

The expenditure for the year was £92 7s. 6d.

HIKURANGI DRAINAGE AREA (50,000 acres).

This work was commenced at the beginning of June, 1919, the first work being the final definition of boundaries enclosing the proposed rating-area. After such had been carried out and agreed on at a meeting held at Hikurangi, where there were present the Chief Drainage Engineer, Messrs. Mander and Reed, M.P.s, and settlers concerned, the detailed engineering and land surveys requisite for the promulgation of the drainage scheme were put in hand. The area was proclaimed a drainage area in terms of the Swamp Drainage Act, 1915, on the 26th August, 1919.

The surveys included—(a) The location and engineering surveys for proposed Wairua River diversion; (b) land surveys in connection therewith; (c) location and engineering surveys for Wairua River spillways; (d) land surveys in connection therewith.

Work (a) was undertaken first, and on a preliminary investigation it was ascertained that the originally planned route of proposed diversion could possibly with advantage be varied by taking an alternative line which would be shorter in length, and at the same time simplify to a considerable extent the work of construction. Both lines were, however, carefully surveyed in order to institute a direct mathematical comparison, and with the result that on the basis of the scheduled prices originally used in the estimate of 1879 it was shown that a saving of some £7,300 could be effected by taking the alternative route. The engineering survey included the putting-down of about 450 borings to ascertain the rock depths along each proposed line.

Work (b), land surveys, was carried out in conjunction with the above, being properly based on adjacent available trig work.

On the completion of the diversion surveys, work (c) was taken in hand, and included the location and engineering survey of some nineteen spillways (or overflow channels), proposed to relieve the Wairua River in its tortuous channel in time of flood, and extending from the upper end of the proposed diversion to Whakapara, a distance of some 29½ miles by river. This by taking the line of spillways would be reduced by about ten miles.

In order to properly connect up the work continuous levels were run from the diversion right up the Wairua River to Whakapara, included all the spillways, and were properly checked to eliminate error. The proposed scheme has therefore been worked up in terms of one fixed datum, and direct comparisons can at once be made between any two points.

Work (d), land surveys, was carried out, together with the engineering surveys, for the purpose of taking, under the Act, what areas are required for the actual construction of the spillways, and the surveys themselves have been properly connected up with previous reliable work.

In addition the Wairua River from its commencement at the junction of Whakapara and Waiotu Streams to the proposed diversion-site (a distance of about 21½ miles) has been sounded to ascertain shallows, &c., and to enable a profile of the river to be plotted in terms of the fixed datum established. Two spillways which it is proposed to convert into actual river-diversions have been bored for rock depths. Flood and low summer levels of river have been established, and cross-sections of the river-bed taken at convenient points.

The plan work in connection with all these surveys was kept as far as possible forward during the progress of same, and from time to time provisional reports and estimates worked up for consideration.

Since the completion of the surveys, in January, 1920, the plan work, calculations, &c., have been pushed along with all despatch.

On its being decided to adopt the alternative line of diversion, the drawings, &c., in connection therewith were concentrated on, the engineering portion being prepared with a view of letting this portion of the work by contract. At the end of March of this year the position was that these were approaching completion, the plans of spillways had been completed, also longitudinal sections of 21½ miles of Wairua River, and the requisite land plans, comprising four 30 in. by 30 in. sheets.

Further sketches of what is proposed have also from time to time been prepared to illustrate reports, in which the technical details in connection with the scheme have been outlined.

The total expenditure for the year was £826 14s. 3d., of which wages absorbed £605 2s. 10d.

The local officer in charge is Mr. E. C. Robinson, who has zealously carried out his duties.

GENERAL.

The acquisition of further machinery having been decided on by the Hon. Minister of Lands, I am about to proceed to America for purpose of selecting the most up-to-date plants obtainable. Plants for all works will be purchased, and the result should be a more rapid development of all the areas now under review.

I have, &c.,

J. B. THOMPSON,

Chief Drainage Engineer.

The Under-Secretary for Lands, Wellington.

STATEMENT OF TRANSACTIONS DURING THE YEAR ENDED 31ST MARCH, 1920.

<i>Receipts.</i>		£	s.	d.	<i>Payments.</i>		£	s.	d.	£	s.	d.
Cash in hand at 1st April, 1919	..	6,263	13	4	Kaitaia Drainage District—							
Debentures issued under Swamp Land Drainage Act	..	27,000	0	0	Drainage - works, stop-banks, clearing channels, and other expenditure incidental to drainage operations, including wages and supplies	..	27,402	3	1			
					Management and engineering expenses	..	658	14	8			
					Stores	..	305	7	10			
					Loose tools	..	246	8	9			
										28,612	14	4
					Waihi Drainage District—							
					Drainage - works, stop-banks, clearing channels, and other expenditure incidental to drainage operations, including wages and supplies	..	1,263	6	1			
					Management and engineering expenses	..	64	7	11			
					Stores	..	327	7	2			
					Loose tools	..	2	17	6			
										1,657	18	8
					Poukawa Drainage District—							
					Drainage - works, stop-banks, clearing channels, and other expenditure incidental to drainage operations, including wages and supplies	..	93	2	6			
					Management and engineering expenses	..	3	7	8			
										96	10	2
					Hikurangi Drainage District—							
					Drainage - works, stop-banks, clearing channels, and other expenditure incidental to drainage operations, including wages and supplies	..	574	3	2			
					Management and engineering expenses	..	260	8	8			
										834	11	10
					Machinery, plant, &c.	..				339	6	9
					Cash in hand at 31st March, 1920	..				1,722	11	7
										£33,263	13	4

BALANCE-SHEET.

<i>Liabilities.</i>		£	s.	d.	<i>Assets.</i>		£	s.	d.
Debentures issued under the Act	..	73,000	0	0	Kaitaia Drainage District—				
Consolidated Fund—Interest paid	..	3,344	17	6	Drainage-works Account..	52,139	17	10	
Public Works Fund—Land Improvement					Interest Account (propor-				
vote	..	4,563	19	7	tion chargeable to dis-				
					trict)	..	2,354	4	8
									54,494 2 6
					Waihi Drainage District—				
					Drainage-works Account..	13,550	4	9	
					Interest Account (propor-				
					tion chargeable to dis-				
					trict)	..	764	17	2
									14,315 1 11
					Poukawa Drainage District—				
					Drainage-works Account..	2,001	10	1	
					Interest Account (propor-				
					tion chargeable to dis-				
					trict)	..	204	13	4
									2,206 3 5
					Hikurangi Drainage District—				
					Drainage-works Account..	834	11	10	
					Interest Account (propor-				
					tion chargeable to dis-				
					trict)	..	21	16	4
									856 8 2
					Machinery and plant	..			6,106 10 5
					Loose tools	..			202 4 1
					Stores on hand, 31/3/20	..			1,005 15 0
					Cash in hand, 31/3/20	..			1,722 11 7

J. H. O'DONNELL, Chief Accountant.

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