

1939.
NEW ZEALAND.

DEPARTMENT OF LANDS AND SURVEY.

DRAINAGE OPERATIONS IN HAURAKI PLAINS.

REPORT FOR THE YEAR ENDED 31st MARCH, 1939, TOGETHER WITH STATEMENTS OF ACCOUNTS.

*Presented to both Houses of the General Assembly pursuant to Section 20 of the
Hauraki Plains Act, 1926.*

Department of Lands and Survey, Wellington, 1st July, 1939.

SIR,—

I have the honour to present herewith the report of the Chief Drainage Engineer on operations carried out during the past year on the Hauraki Plains in accordance with the provisions of the Hauraki Plains Act, 1926.

I have, &c.,

R. G. MACMORRAN,

Under-Secretary for Lands.

The Hon. Frank Langstone, Minister of Lands.

REPORT OF THE CHIEF DRAINAGE ENGINEER.

SIR,—

I have the honour to submit the thirty-first annual report on the land drainage and development works carried out on the Hauraki Plains during the year ended 31st March, 1939.

The district has been adversely affected by the excessive rainfall in 1938, and farm production is generally below that of last year.

Particulars of the quantity and value of the principal products of the district compiled from returns supplied by the courtesy of the trading concerns who handle a large portion of the produce of the district are given below.

The returns received are by no means a complete record of the annual production from the district, but the information available will serve to give some indication of the high productive capacity created by the reclamation of waste swamp land. The figures in parentheses are the returns for the previous year :

					Tons.	Value. £
Butter .. .. .	..	..	..	..	2,962 (3,373)	409,922
Cheese .. .. .	..	..	..	..	3,079 (3,024)	244,024
					Number.	
Pigs .. .. .	..	..	..	..	18,470 (23,372)	39,420
Calves .. .. .	..	..	..	..	20,782 (15,509)	7,200
Cattle .. .. .	..	..	..	..	14,096 (9,129)	66,300
Sheep .. .. .	..	..	..	..	3,528 (..)	
Horses .. .. .	..	..	..	..	104 (..)	
						<hr/> £766,866 <hr/>

Cargo despatched and received over the Piako River wharves, 4,472 tons.

The rainfall at Kerepechi in 1938 was 58.43 in. The average annual rainfall over a period of twenty-two years is 43.85 in. The wettest month was February, with a fall of 9.42 in., and the driest, October, with a fall of 0.84 in. Rainfall records for Kerepechi are as follows:

RECORDS OF DAILY PRECIPITATIONS, KEREPECHI, HAURAKI PLAINS.

Year.	Number of Days, with given Daily Precipitation in Inches.												Total Days.	Total Fall.	Wettest Month.	Driest Month.
	0.00 to 0.49.	0.50 to 0.74.	0.75 to 0.99.	1.00 to 1.24.	1.25 to 1.49.	1.50 to 1.74.	1.75 to 1.99.	2.00 to 2.49.	2.50 to 2.99.	3.00 to 3.99.	4.00 to 4.99.	5.00 to 5.99.	6.00 to 7.00.			
1917 ..	131	11	4	4	3	..	1	1	1	..	..	..	156	45.61	Feb. 6.26	Jan. 0.65
1918 ..	145	14	6	4	..	1	..	..	1	..	..	..	171	44.06	Oct. 7.47	May 2.24
1919 ..	122	9	1	3	2	..	..	..	..	..	..	..	137	27.36	July 4.52	Dec. 0.89
1920 ..	85	7	10	3	1	1	3	2	..	..	..	..	112	43.16	Feb. 6.10	July 1.73
1921 ..	93	12	5	3	2	..	..	1	..	..	..	..	116	34.43	Oct. 5.89	Feb. 0.72
1922 ..	101	17	9	3	..	1	1	..	1	..	..	..	133	42.81	Feb. 6.62	April 1.73
1923 ..	151	6	5	4	..	1	1	..	..	..	..	1	169	47.04	April 9.76	March 1.72
1924 ..	132	8	10	5	2	5	1	1	..	2	..	..	166	60.37	April 8.55	July 1.87
1925 ..	142	15	4	2	..	..	..	1	..	..	..	..	164	37.64	June 6.67	April 0.84
1926 ..	149	15	6	1	5	2	2	..	..	..	..	..	183	55.53	May 8.86	Feb. 1.79
1927 ..	159	10	6	5	..	4	..	..	..	..	..	..	184	45.33	July 6.29	April 2.01
1928 ..	125	7	9	2	3	2	2	1	..	..	..	..	151	47.30	May 7.52	Jan. 0.01
1929 ..	124	19	8	3	1	..	..	..	..	..	..	..	155	41.05	April 5.09	Feb. 0.74
1930 ..	131	4	2	2	3	..	2	2	..	..	..	..	146	37.72	Jan. 6.87	Dec. 0.80
1931 ..	144	10	7	..	4	..	..	..	..	2	..	..	167	43.23	July 7.80	March 0.98
1932 ..	126	7	5	4	..	1	..	..	..	..	..	..	143	32.05	Feb. 4.95	Nov. 0.93
1933 ..	152	13	1	4	3	..	..	1	..	..	..	..	174	38.93	Feb. 6.54	March 1.20
1934 ..	138	11	6	5	2	2	..	1	..	1	..	..	166	43.23	June 6.15	Oct. 2.05
1935 ..	163	15	6	4	2	2	..	1	..	1	..	..	194	53.42	July 9.56	Jan. 0.93
1936 ..	127	11	6	3	..	1	..	..	..	2	..	..	150	40.62	Feb. 5.83	May 1.63
1937 ..	76	21	8	5	1	1	1	1	..	..	..	..	114	45.51	May 5.89	Feb. 0.51
1938 ..	54	19	13	6	4	2	1	2	..	..	..	..	101	58.43	Feb. 9.42	Oct. 0.84
1939* ..	9	..	..	..	2	..	..	1	..	..	..	..	12	6.07	Jan. 3.98	March 0.46

* First three months of year only.
Average rainfall over twenty-two years is 43.85 in.

In May the stop-banks on the foreshore of the Hauraki Gulf and mouths of the Waihou and Piako Rivers were topped by an extraordinary high tide. An area of over 10,000 acres of Hauraki Plains land was flooded by sea-water, and also a considerable area at Miranda and on the banks of the Waihou River where there are no stop-banks. Extensive damage was caused to the stop-banks and drains under the control of the Hauraki United and Hauraki Plains West Drainage Boards. The settlers on the flooded areas suffered loss and inconvenience through having to remove their stock, but it is pleasing and surprising to be able to record that the land that had been flooded with salt or brackish water produced the best pastures in the district the following summer.

The following is a general review of the works carried out during the year:

DREDGES.

Three bank-operating excavators and one floating dredge have been in commission during the year. The total quantity of material excavated by this plant was 206,412 cubic yards.

No. 15 Bucyrus excavator completed the Reservoir Canal in June, and after essential repairs had been carried out resumed work widening and deepening the Piako River between 12 miles 40 chains and 13 miles 10 chains. The spoil was used to strengthen the stop-banks on the right bank of the river. At the end of March the river-improvement work on this reach had been completed with the exception of about 5 chains. On completion of this section the plant will be laid up for a much-needed overhaul. Using a $\frac{1}{2}$ cubic yard Page bucket, and operating with a 50 ft. boom, this machine handled 57,204 cubic yards in 184 working-days at a unit cost of 7.95d.

No. 16 Bucyrus excavator has been continuously employed widening the Waitakaruru-Maukoro Canal and constructing a road embankment on the right side of the canal. To avoid as far as possible double handling of spoil, two operations are necessary to enlarge the canal to the prescribed cross-section. Working down-stream from the 2 mile 23 chain peg, the canal was partially enlarged to 1 mile 73 chains and the spoil was placed to form a track for the machine. In the final operation it will complete the canal and place the spoil to form a road embankment. Between peg O at the bridge on the Pokero-Thames Highway to 1 mile 73 chains, the road was formed with spoil excavated from the canal. The total quantity of material excavated using a $\frac{1}{2}$ cubic yard bucket on 50 ft. boom was 72,873 cubic yards in 235 working-days, and the cost was 6.31d. per cubic yard.

No. 29 Bay City drag-line excavator is a light machine which operates on caterpillar crawlers and is equipped with a pneumatic-tired trailer for long-distance transportation. The number of jobs on which this machine has been engaged during the year serves to illustrate the usefulness and adaptability of this type of machine for general construction work. During April it was employed raising the Waihou River and foreshore stop-banks in the Orongo Settlement; from May to July it was employed on emergency work at Orongo, Turua, Shelly Beach, and Hopai, repairing breaks in the stop-banks caused by tidal overflow. Access to this work would have been impossible for a heavier

type of machine, and if carried out by manual labour the work would have been costly and difficult owing to the encroachment of the tide. From August to October the machine was used to raise the stop-banks on the Piako River downstream from Hocalia, and from November to the end of March it has been filling clay into motor-trucks from a pit for the formation of Orchard West Road. The machine operates a $\frac{3}{4}$ cubic yard bucket on 30 ft. beam, and handled 51,301 cubic yards of material during the year at a unit cost of 4d. in 192 working-days.

No. 2. Priestman dredge was reconditioned last year to open up the Waitakaruru Mankoro Canal above the temporary dam at 3 miles 55 chains. A floating plant was necessary to place sufficient spoil on the canal banks to carry a bank-operating machine. This dredge, which has been in intermittent use for over thirty years, is now beyond efficient service and is to be scrapped. The dredge excavated 25,031 cubic yards from 150 chains of canal, and the cost was 11·2d. per cubic yard.

The following table shows the total quantities excavated each year by the dredges during the past seventeen year, with the average unit cost for each year:

Year.	Cubic Yards.	Cost per Cubic Yard. d.
1922-23	440,092	8·20
1923-24	508,654	7·27
1924-25	822,286	5·86
1925-26	856,653	6·32
1926-27	647,182	7·42
1927-28	652,413	7·32
1928-29	619,911	6·54
1929-30	595,565	6·25
1930-31	536,692	8·32
1931-32	390,611	7·99
1932-33	200,954	8·00
1933-34	116,224	5·96
1934-35	52,517	10·02
1935-36	164,046	8·26
1936-37	171,717	8·69
1937-38	261,347	5·72
1938-39	206,412	7·36

WAITAKARURU-TOIANGA DISTRICTS.

Activities in these districts have been connected principally with land-development operations in the Ponarua Block which are being carried out under the small-farms scheme. About eighty men have been employed throughout the year, and cleaned 22 miles 67 chains of drains, excavated 51,000 cubic yards in widening and deepening 32 miles 47 chains of existing drains and 114,238 cubic yards in the construction of 60 miles 71 chains of new drains; 16,518 cubic yards of clay were hauled a distance of three to six miles on light railway for ballasting peat roads; 265 acres was cleared and 584 acres sown in grass after burning felled scrub; 8,000 ft. of piping was laid for water-supply, and 6 miles 48 chains of fencing erected. Forty chains of the Mankoro Canal Left Embankment Road was re-formed and metalled. For the formation of 89 chains of Orchard West Road 17,320 cubic yards of clay ballast was hauled in motor-trucks an average lead of about 40 chains.

The effect of the improvement of the main drains carried out during recent years and the extensive system of subsidiary and field drains now under construction is apparent in the gradual consolidation of the peat in an area of 10,000 acres. Road construction is providing access to the land, and as it becomes fit for grazing it is being cleared, fenced, and sown in grass. When this stage is reached the process of soil-formation by decomposition of peat can be hastened by systematic stocking.

KEREPECHI-AWAITI DISTRICTS.

A party of three to twelve men has been employed on the Kerepechi Extension Block, of 2,300 acres, clearing scrub and controlling noxious weeds on 690 acres. An area of 690 acres has been cleared of scrub and sown in grass, and 2½ miles of roadway cleared of blackberry. On an area of 1,100 acres of this block which has been brought under the small-farms-development scheme, 632 chains of fencing has been erected and a water-supply scheme installed, and stock can now be confined to limited areas, which will greatly assist in the development of this peat-swamp area. For the improvement of 7 miles 77 chains of main drains in this district 12,699 cubic yards was excavated by manual labour and 20 miles 8 chains of main and subsidiary drains cleaned; 10 miles 27 chains of main drains were cleaned with weed-cutting launch; 166 cubic yards of metal was used for road-maintenance.

At Orongo Settlement extensive repairs have been carried out to 90 chains of stop-bank damaged by tidal overflow and also to two flood-gates; 37,618 cubic yards of material was excavated by machine for repairs to stop-banks and enlarging 69 chains of main drains; drains 2 miles 60 chains in length were cleaned by contractors, who also excavated 1,535 cubic yards in the improvement of 75 chains of drains.

During the months of April, July, and August the Kerepechi Block drainage pump operated intermittently for a total period of 267 hours. The longest period of continuous operation was 62 hours. The pumping-station has provision for two pumps, but only one pump of 31,500 gallons per minute capacity has been installed. As the result of floods in the Piako River, flood-gate action at Kerepechi was restricted for a period of twenty-two days, but fortunately there were only two days when there were no flood-gate discharges and the pump was able to cope with the drainage.

The Piako River ferry service has been in continuous operation at Kaihere.

PATETONGA-TAHUNA DISTRICT.

A working-party of five to seven men has been continuously employed on drain construction and maintenance in the Patetonga district: 30 miles 25 chains of main drains were cleaned and 21,069 cubic yards of material excavated for the improvement of 10 miles 60 chains of drains. During the summer months two gangs have been employed removing the willows on the banks of the Piako and Waitoa Rivers which had previously been killed by ring-barking and poisoning. Both banks of the Waitoa River have now been cleared for a distance of 3 miles 40 chains downstream from Whakahoro Road, and a reach of the Piako River 6 miles 70 chains in length between Whakahoro Road and a point 1 mile below Barnett's Bridge has now been cleared of willows and snags.

During the summer an accidental fire caused the destruction of 2,000 acres of flax which was the principal source of supply for a large flax-mill which has been operating intermittently for a number of years at Patetonga.

ESTABLISHMENT.

In the office, workshops, and store at Kerepechi a very competent staff has been busily engaged on work connected with the drainage operations and also several land-development schemes in progress outside the Hauraki Plains district.

Engineering surveys carried out during the year required 114 miles 43 chains of traverses and 75 miles 48 chains of levels.

SUMMARY.

The total length of subsidiary drains constructed on the Hauraki Plains since the inception of the scheme is now 855 miles 59 chains.

The principal works carried out during the year under review on the Hauraki Plains are summarized in the following schedule :—

	Length. M. Ch.	Excavation. Cubic Yd.
Drains cleaned by manual labour	76 00	..
Drains widened and deepened by manual labour	52 19	86,303
Drains constructed by manual labour	60 71	114,238
		200,541
Drains cleaned by weed-cutting launch	10 27	..
Drains improved by machines	0 69	7,748
River and canal and stop-bank improvement by machines	4 0	130,323
Clay ballast delivered on peat roads by light railway .. .. .	..	16,518
Clay ballast delivered on peat roads by motor-lorries	1 0	17,320
		Number.
Sleepers cut and delivered for tramway .. .. .	..	6,860
Road-formation	2 33	..
Road-metalling---		
Resurfacing	1 10	Cubic Yd. 166
Two courses	0 40	1,080
		Acres.
Area cleared of scrub, rushes, &c. .. .. .	..	955
Area sown in grass .. .. .	..	1,274
River-banks cleared of willows and scrub	4 58	..

I have, &c.,
R. L. INNIS,
Chief Drainage Engineer.

The Under-Secretary for Lands, Wellington.

HAURAKI PLAINS SETTLEMENT SCHEME.

RATE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1939.

<i>Dr.</i>	£	s.	d.	<i>Cr.</i>	£	s.	d.
Maintenance, completed works	1,913	12	0	Balance brought forward	1,902	8	6
Remission of rates	123	16	10	Rates levied	1,780	11	3
Balance	1,738	0	10	Ten-per-cent. penalty added to unpaid rates for 1937-38 and 1938-39	92	9	11
	£3,775	9	8		£3,775	9	8

RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1939.

<i>Receipts.</i>				Public Works Fund.		Consolidated Fund.		<i>Payments.</i>				Public Works Fund.		Consolidated Fund.					
				£	s.	d.	£	s.	d.					£	s.	d.			
Rates	..	..	..	..			2,432	4	11	Drainage works: Stop-banks, clearing channels, and other expenditure incidental to conducting drainage operations (including formation and metalling of roads), materials supplied, &c.	..	12,632	19	5	..		
Law-costs	..	..	..	..			4	9	9	Material and stores	..	11,634	19	9	..		
Sale of land	18,357	6	6				Maintenance, completed works	..				1,711	1	8		
Rents and grazing fees			7,409	3	1	Refund rent and interest	..	..	..	..	200	13	5		
Interest on sales of land			1,330	0	9	Refund miscellaneous receipts	..	..	..	..	30	14	8		
Artesian-well boring: Interest on advances						Refund rates	..	..	..	..	4	5	0		
Ferry fares			3	12	6	Kaihero Ferry expenses	..	..	..	..	313	14	4		
Credits in reduction of expenditure	18,294	15	0	191	3	9	Adjustment (expenditure charged in error)	..	192	7	3	..				
Adjustment (amount received in error)	0	4	6				Transfer receipts to Treasury Adjustment Account	..	..	..	..	13,398	13	10		
Miscellaneous receipts			1,798	9	11	Transfer receipts to Public Works Fund	..	36,652	1	6	..				
Royalties			465	2	3										
Transfer expenditure to Treasury Adjustment Account			2,024	16	0										
Transfer expenditure to Public Works Fund	24,460	1	11	..												
				£61,112	7	11	£15,659	2	11					£61,112	7	11	£15,659	2	11

REVENUE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1939.

<i>Dr.</i>	£	s.	d.	<i>Cr.</i>	£	s.	d.
Interest on capital	34,516	7	2	Accrued rents	7,353	4	2
Kaihero Ferry expenses	311	6	10	Interest on sales of land, &c.	1,731	10	11
Administration expenses	438	19	0	Grazing fees	7	7	9
Remissions of rent	750	12	9	Ferry fares	186	4	9
Remissions of interest	101	9	4	Hire of plant	2	14	0
Rebates	619	14	6	Royalties	467	11	7
Capital reductions under Mortgagors and Lessees Rehabilitation Act, 1936	286	16	11	Net loss carried down	27,312	19	3
Irrecoverable rents, &c.	21	15	11				
Premiums on conversion	14	10	0				
	£37,061	12	5		£37,061	12	5
	£	s.	d.		£	s.	d.
Net loss brought down	27,312	19	3	Balance carried forward	336,605	11	0
Balance from previous year	309,292	11	9		£336,605	11	0
	£336,605	11	0				

