

1940.
NEW ZEALAND.

DEPARTMENT OF LANDS AND SURVEY.

DRAINAGE OPERATIONS IN HAURAKI PLAINS.

REPORT FOR THE YEAR ENDED 31ST MARCH, 1940, 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 June, 1940.

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-second annual report on the land drainage and development works carried out on the Hauraki Plains during the year ending 31st March, 1940.

A year-by-year comparison of the production figures given in the Hauraki Plains annual reports for the past ten years shows that the average rate of increase in production of butter and cheese is about 200 tons per annum, comprising approximately 150 tons of cheese and 50 tons of butter. These figures represent the normal average annual increase due to expansion of farming activities in a decade. As the result of the excellent season the factory returns for this year show an advance of 600 tons on the previous highest production record. Returns kindly supplied by firms and individuals handling most of the produce show that the value of the principal dairy and pastoral products of the district during the year under review was over £872,000. This is a new high record for the district, and it can be confidently stated that the time is not far distant when the value of the production from the reclaimed swamp will be £1,000,000 per annum.

Production figures compiled from the returns received are given below. The figures in parentheses are the returns for the previous year.

	Tons.	Value. £
Butter	3,401 (2,962)	743,795
Cheese	3,942 (3,079)	
	Number.	
Pigs	20,882 (18,470)	52,500
Calves	19,714 (20,782)	8,894
Cattle	13,637 (14,096)	67,212
Sheep	4,058 (3,528)	
Horses	100 (104)	
		£872,401

Cargo despatched and received over the Piako River wharves, 5,908 tons.

For some years past the Department's operations have been equally divided between land development and construction connected with drainage, flood-control, and roading. As increased farm production is the ultimate object of all these activities, they must be adjusted to the war situation without impeding progress. Equal in importance to active new development is the problem of maintaining that which has already been created, and in this connection I have to direct attention to two matters of importance. These are the maintenance of the tidal stop-banks on the foreshore and river-mouths, and the maintenance of the improved river and stream channels.

Two years ago a phenomenon having the characteristics of a tidal bore caused extensive damage to the stop-banks on the Hauraki Gulf and inundated thousands of acres of land. The damage done to these stop-banks was not entirely repaired, and past experience has shown that the stop-banks must be periodically raised because they sink into their mud foundations. Overflow of these banks by a high spring tide this summer indicates that they require immediate attention. These stop-banks should at least be restored to, and maintained at, their original dimensions.

Graphical comparison of the 1939 flood stages with prior floods indicates some deterioration of the recently improved river-channel. There is evidence of shoaling at bends and bank accretion, and the time has arrived when financial arrangements must be made for maintenance dredging.

The rainfall at Kerepechi in 1939 was 45.15 in. The average rainfall over a period of twenty-four years is 44.257 in. The wettest month was June, with a fall of 7.66 in., and the driest March, with a fall of 0.46 in.

Rainfall records of daily precipitation at Kerepechi, Hauraki Plains, since 1916 are as follows:—

RECORDS OF DAILY PRECIPITATION, 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.	
1916	109	12	9	7	2	3	..	1	..	..	1	..	144	52.19	Nov.	6.65	Feb.	1.05
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	..	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	4	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	94	12	6	4	6	..	..	1	..	..	..	..	123	45.15	June	7.66	March	0.46
1940*	19	1	1	5	..	..	..	..	..	..	..	..	26	10.74	Jan.	7.00	March	0.70

* First three months of year only.

Average rainfall over twenty-four years is 44.257 in.

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

DREDGES.

One floating dredge and three bank-operating excavators have been in commission during the year.

No. 15 *Bucyrus Drag-line Excavator* completed Piako River improvement work on the reach between 12 miles 40 chains and 13 miles 15 chains in April, 1939. After an extensive overhaul carried out at the Kerepechi depot, the machine redredged the Mangawhero Stream for a distance of 65 chains from the Piako River. Since February this plant has been operating on a punt and constructing a stop-bank along the southern side of the Kaihere Road, where, owing to continuous subsidence of the road embankment, further protection against flood overflow is now required. In 125½ working-days the machine excavated 31,564 cubic yards of material at cost of £s. 9.2d. per cubic yard. The high unit cost is due to heavy expenditure on the complete overhaul of the plant.

No. 16 *Bucyrus Drag-line Excavator* has been continuously employed widening the Waitakaruru-Maukoro Canal, and during the year completed the reach between the State Highway bridge and the mouth and also, working upstream again, has partially completed the canal-construction between pegs 0 m. and 1 m. Using a ½-yard bucket on 50 ft. boom, the machine handled 64,607 cubic yards of material in 224 working-days at unit cost of 7.3d.

No. 29 Bay City Light Excavator: At the commencement of the year this machine was employed filling clay into motor-trucks for ballasting the Orchard West Road. During the period May to November the machine was used to raise the stop-bank on the right bank of the Piako River, completing 28 chains between the 5-mile and 6-mile pegs and 91 chains downstream from the Ngatea Bridge. Later it was used for enlarging Prices Drain for the Hauraki United Drainage Board, and in February the plant was sent by rail to Tangowahine, where it is still employed. In 167½ working-days the output of this machine has been 46,346 cubic yards and the unit cost 4.4d. per cubic yard.

No. 11 Priestman Dredge has been used for the removal of willows from the bed and banks of the Piako and Waitoa Streams. Working in the Waitoa Stream, the dredge cleared the reach 150 chains in length upstream from the Piako River Junction. Since October the dredge has worked in the Piako River for a distance of 200 chains downstream from the Waitoa River. Because of the low river-banks, this work would be frequently interrupted by floods if carried out by the usual method of employing some type of bank-operated hauler. By the use of the dredge as a floating crane the difficulty has to a considerable extent been overcome.

The following table shows the total quantities excavated each year by the dredges with the average annual unit cost for eighteen years:—

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	6.70
1939-40	142,517	9.48

WAITAKARURU-TOREHAPE DISTRICTS.

As a result of considerable activity in road and drain construction and land development important advances have been made during the last three years with the preparation for settlement of a block of 10,000 acres of peat land situated within these districts and known as the Pouarua Block.

A comprehensive roading system is being constructed, and, because the land is deep peat, road-formation is carried out by laying clay ballast varying in depth from 4 ft. to 6 ft. over the peat subgrade. Some of the clay ballast is obtained by deep excavation in canals, but most of the required material is transported from the hills by tramway for distances varying between one and seven miles. Road-construction carried out during the past year comprises formation of the Maukoro Canal Right Bank Road for a distance of 153 chains southwards from the main highway bridge and completing base-course metalling with 2,404 cubic yards of metal, also delivery by tramway of 22,816 cubic yards of clay ballast along 3 miles 63 chains of roadway and 852 cubic yards by motor-trucks along the Orchard West Road. One 25-ft.-span road bridge was constructed on Central Road.

Preliminary construction has been practically completed on a grid-iron system of drains covering the entire area of the Pouarua Block, comprising main, subsidiary, and field drains. The latter are generally 4 ft. deep and spaced at about 10 chain intervals. Drainage-work of the future will be principally widening and deepening these drains as the land consolidates and subsides.

Drainage-work carried out during the year by manual labour comprises cleaning 51 miles 22 chains of drains; excavation of 28,660 cubic yards of materials in widening and deepening 13 miles 12 chains of existing drains, and 53,452 cubic yards in the construction of 33 miles 9 chains of new drains.

Pre-settlement land development work on behalf of the Small Farms Board is being carried out on the Pouarua Block as the land consolidates in response to drainage. At Waitakaruru primary pasture has been established on an area of 1,300 acres, and this area is now carrying 2,500 sheep and some cattle. An area of 785 acres has been cleared in another block of 860 acres at Waitakaruru, and this land will be burnt and sown in grass this autumn. At Torehape a block of 680 acres was fenced and sown when an accidental fire swept the area while the scrub was being felled, and another area of 440 acres of heavily timbered swamp, growing scrub, and rough feed, has been ring-fenced in preparation for stocking with cattle. The principal works carried out during the year under review comprises 750 acres of scrub clearing, 915 acres sown in grass, and 13 miles 25 chains of fencing erected.

KEREPECHI-AWAITI DISTRICTS.

Operations in this district have been principally connected with drain-maintenance and land-development. In the neighbourhood of Kerepechi 20 miles 46 chains of main and subsidiary drains were cleaned by manual labour, and 7 miles 20 chains were cleaned and 64 chains widened and deepened at Orongo Settlement. Seven miles of large drains and canals were cleaned by weed-cutting launch.

To recondition 2 miles 77 chains of drain, 3,419 cubic yards of material was excavated, and 1846 cubic yards in the construction of 54 chains of new drains.

Area cleared of heavy swamp growth was 190 acres, and 50 acres was sown in grass and 172 acres of swamp harrowed.

The drainage pump serving the Kerepechi Block operated intermittently during the months of June, July, and August for a total period of 403 hours. The longest period of continuous operation was 62 hours. The Piako River ferry service has been in continuous operation at Kaihere.

Kerepechi is the headquarters, workshop and stores depot for extensive works within and beyond the boundaries of the Hauraki Plains.

PATETONGA-TAHUNA DISTRICTS.

Good progress has been made with the work of clearing the banks of the Piako and Waitoa Rivers. The Waitoa River has now been cleared of willows from the Whakahoro Road to its junction with the Piako, and the banks of the Piako River have during the past three years been cleared of willows from the Whakahoro Road to a point 2 miles 40 chains below the Waitoa Junction. Two working parties have been employed on this work with tractor and log-hauler during the summer, and work in the lower reaches of the Piako River is now being carried out with No. 11 Priestman Dredge.

One hundred and twenty-four logs required for construction works were cut and hauled from the bush on the Waitoa River and 4,300 sleepers cut for tramway.

Drain-maintenance work in the Patetonga District included cleaning 21 miles 6 chains of drains and the excavation of 10,292 cubic yards of spoil to widen and deepen 6 miles 9 chains of drains. During the past three years all main drains in the peat area at Patetonga have been reconditioned.

SUMMARY.

The total length of main and subsidiary drains constructed on the Hauraki Plains since the inception of the Scheme is now 889 miles 42 chains.

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

<i>Drains: General, &c.:</i>	Length. Miles. Ch.	Excavations. Cubic Yd.
Drains cleaned by manual labour	100 14	..
Drains widened and deepened by manual labour	23 2	44,268
New drains constructed by manual labour	33 63	55,298
		99,566
Drains cleaned by weed-cutting launch	7 0	..
Drains improved by machines	0 54	5,400
Rivers, canals, and stop-banks improved by machines	4 9	137,117
		Ballast.
Clay ballast delivered on peat roads	4 0	23,668
Road-formation	1 73	..
		Metal.
Road-metalling: Base-course only	1 73	Cubic Yd. 2,404
		Acres.
Area swamp harrowed .. .. .	.. .. .	172
Area cleared of scrub .. .. .	.. .. .	955
Area sown in grass .. .. .	.. .. .	991
River-banks cleared of willows	4 45	..
		Number.
Sleepers cut for light tramway .. .. .	.. .. .	4,300
Fences erected	17 8	..

Field and Office Work. Land and engineering surveys carried out during the year involved 4,887 chains of traverse, 3,558 chains of levels, 650 acres of topographical survey and 40 river or canal cross-sections.

The number of men employed on the works controlled from headquarters at Kerepechi varied throughout the year between 108 and 137. These figures do not include extra labour engaged for seasonal drain cleaning work.

I have, &c.,

R. L. INNIS,

Chief Drainage Engineer.

The Under-Secretary for Lands, Wellington.

HAURAKI PLAINS SETTLEMENT SCHEME.

REVENUE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1940.

<i>Dr.</i>			£	s.	d.	<i>Cr.</i>			£	s.	d.
Interest on capital .. .. .	..	..	33,939	18	7	Accrued rents .. .. .	..	..	6,306	5	2
Kaihere Ferry (net cost of operating) .. .. .	..	..	122	12	1	Interest on sales of land, &c. .. .. .	..	..	1,824	14	9
Administration expenses .. .. .	..	..	381	1	3	Grazing fees .. .. .	..	..	1	4	3
Remissions of rent .. .. .	..	..	693	13	2	Hire of plant .. .. .	..	..	120	13	0
Remissions of interest .. .. .	..	..	151	4	8	Royalties .. .. .	..	..	131	16	7
Rebates .. .. .	..	..	592	4	10	Net loss carried down.. .. .	..	..	27,908	14	1
Capital reductions under section 216, Land Act, 1924 .. .. .	..	..	205	0	0						
Capital reductions under Mortgages and Lessees Rehabilitation Act, 1936 .. .. .	..	..	127	8	8						
Irrecoverable rents, &c. .. .. .	..	..	65	12	1						
Recovery of amount previously written off .. .. .	..	..	0	2	6						
Premiums on conversion .. .. .	..	..	14	10	0						
			£36,293	7	10				£36,293	7	10
			£	s.	d.				£	s.	d.
Net loss brought down .. .. .	..	..	27,908	14	1	Balance carried forward .. .. .	..	..	364,514	5	1
Balance from previous year .. .. .	..	..	336,605	11	0						
			£364,514	5	1				£364,514	5	1

RATE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1940.

<i>Dr.</i>			£	s.	d.	<i>Cr.</i>			£	s.	d.
Maintenance completed works .. .. .	..	..	2,146	11	9	Balance brought forward .. .. .	..	..	1,738	0	10
Remissions of rates .. .. .	..	..	515	15	11	Rates levied .. .. .	..	..	2,010	7	6
Balance .. .. .	..	..	1,086	0	8						
			£3,748	8	4				£3,748	8	4

RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1940.

<i>Receipts.</i>				<i>Payments.</i>							
	Public Works Fund.		Consolidated Fund.		Public Works Fund.		Consolidated Fund.				
	£	s.	d.		£	s.	d.				
Rates .. .. .	..	..	1,761	19	9	Drainage works : Stop-banks, clearing channels, and other expenditure incidental to conducting drainage operations (including formation and metalling of roads), materials supplied, &c. ..	9,349	5	4		
Law-costs .. .. .	..	..	11	1	5	Material and stores	9,265	15	8		
Sale of land	14,520	9	11	..	..	Maintenance completed works .. .. .	..	..	1,839	4	8
Rents and grazing fees .. .. .	..	..	6,317	18	5	Refund rent .. .. .	..	..	84	18	0
Interest on sales of land .. .. .	..	..	1,483	19	3	Refund miscellaneous receipts .. .. .	..	..	1,777	16	10
Artesian-well boring—						Refund sales of land	305	0	0	..	..
Interest on advances .. .. .	..	..	2	18	3	Kaihere Ferry expenses .. .. .	..	..	282	7	10
Repayment of advances .. .. .	..	0	18	2	..	Adjustment refund of amount received in error .. .. .	..	0	4	6	..
Ferry fares .. .. .	..	..	165	8	3	Purchase of land .. .. .	..	4	0	0	..
Credits in reduction of expenditure	14,882	6	6	..	..	Transfer receipts to Treasury .. .. .	..	..	10,052	19	4
Miscellaneous .. .. .	..	..	177	17	5	Adjustment Account .. .. .	..	..	..	..	..
Royalties .. .. .	..	..	131	16	7	Transfer receipts to Public Works Fund	29,403	14	7	..	..
Transfer expenditure to Treasury .. .. .	..	..	3,984	7	4						
Adjustment Account .. .. .	..	..	..	..	..	
Transfer expenditure to Public Works Fund	18,924	5	6	..	..				
			£48,328	0	1				£48,328	0	1
			£14,037	6	8				£14,037	6	8

