

1930-31.

LEGISLATIVE ASSEMBLY.
NEW SOUTH WALES.

REPORT
OF THE
DEPARTMENT OF PUBLIC WORKS
FOR THE
YEAR ENDED 30TH JUNE, 1930,
Together with Diagrams.

Ordered by the Legislative Assembly to be printed, 20 May, 1931.



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THE DEPARTMENT OF PUBLIC WORKS.

(ANNUAL REPORT FOR THE YEAR 1929-30).

The Director of Public Works to the Honorable the Minister for Public Works.

Department of Public Works, N.S.W.,
Sydney, 30th April, 1931.

Dear Sir,

Report upon the operations of the Public Works Department for the financial year ended 30th June, 1930, is submitted hereunder :—

FINANCIAL.

Statements furnished by the Accountant and attached to this report disclose the extent of the operations of the Department. As compared with the previous year, 1928-29, the year's expenditure shows a decrease of £527,090 9s. 4d. The figures for the respective years are :—1928-9, £5,829,251 1s. 3d., and 1929-30, £5,302,160 11s. 11d.

The principal Branches of expenditure were :—

	£
Sydney Harbour Bridge	1,677,373
River Murray Agreement	327,744
Architectural	492,554
Water Supply	457,200
Sewerage and Stormwater Channels	523,138
Dredge Service	209,523
Harbours and Rivers	245,858
Electrical	277,802
Roads	271,712
Bridges	109,435
Works for other Departments	883,058

WATER SUPPLY AND SEWERAGE BRANCH.

Water Supply.

During the year works of water supply were carried out in twenty-four towns, and similar works were in progress in thirteen towns. The principal schemes brought to completion were at Bega, Gloucester, Inverell, Narromine and Wyong. At the close of the year new schemes of water supply were in course of construction at Cargelligo, Grenfell, Scone, Tenterfield and Werris Creek.

Investigations of new schemes of water supply were carried out in eight areas, and for the augmentation of existing supplies in seven towns.

The existing country towns water supplies, generally speaking, were adequate to meet requirements during the drier periods of the year with the exception of Parkes, Goulburn, Orange, Dubbo and Mudgee where restrictions were imposed. At Broken Hill restrictions were imposed for two months, while at Portland it was necessary to fall back on a supply from the Commonwealth Cement Company's bore for a time.

South-west Tablelands Water Supply Scheme.

This scheme embodying the towns of Cootamundra, Murrumburrah-Harden, Young, Stockinbingal, Temora, Wyalong and West Wyalong was commenced. Work on two pumping stations and a filtration plant is in hand, as well as two concrete settling tanks; a steel gravitation main is being laid to serve the town of Cootamundra, which will be the first town to benefit under the scheme.

Sewerage.

The sewerage of Albury, Bathurst and Goulburn, and reticulation extensions at Lithgow and Narrandera were completed.

Augmentation works in connection with the sewerage schemes at Bathurst, Forbes, Goulburn, Lismore, Narrandera, Orange and Wagga were put in hand, and investigations were dealt with for complete new schemes of sewerage in Armidale, Moss Vale, Quirindi and Warren; proposals for additional works were investigated for Albury, Goulburn, Orange and Narrandera.

The Newcastle Sewerage Amplification Scheme is still in hand and £240,869 has been expended as at 30th June, 1930.

Carrington Sewerage.—Detail survey is under revision.

Cardiff Sewerage.—Report has been drafted for submission to the Hunter District Water Supply and Sewerage Board.

Cottage Creek Stormwater Drainage System.—Construction completed. Total cost to 30th June, 1930, £225,492.

Throsby Creek Stormwater Drainage.—About half of the whole system has been completed.

HARBOURS, ROADS AND BRIDGES BRANCH.

Harbours.

The major improvement works at Port Kembla, Newcastle and Coff's Harbour were continued, and 300-ft. extension to No. 4 jetty, Port Kembla, completed.

Repairs and extensions were carried out at Tweed River, Byron Bay, Richmond River, Clarence River, Woolgoolga Jetty, Nambucca River and Macleay River.

~~£102,508~~ £220,502*Dredging.*

A sum of £102,508 was expended in dredging operations; most of the river entrances were visited by bar dredges and maintained at a satisfactory depth. The following new dredging plant was completed and placed in commission:—

New 14-in. all electric suction dredge "Zeno."

Two 130-ton hopper punts.

The following dredging plant was still under construction at the end of the year:—

New 14-inch suction bar hopper dredge "Hermes."

New steel single screw bucket dredge "Pluto."

Conversion to all electric of dredge "Tempe."

The quantity of material lifted during the year totalled 4,209,142 tons, at a cost of 12·57d. per ton as compared with 12·77d. per ton the previous year.

Roads.

The expenditure from all sources was £266,493. In the Western Division the expenditure for repair and maintenance of roads was £21,733. Works carried out for other Departments absorbed £36,723, while unemployment relief works accounted for £114,905. In addition a sum of £93,132 from Federal Aid Road Funds was expended on the construction of roads in the Western Division.

Bridges.

Bridge repairs and maintenance absorbed an amount of £67,975.

The principal bridge completed by the Department was over the Barwon River at Walgett. A number of minor bridges were completed; and various proposals investigated. The construction of the railway and vehicular bridge over the Clarence River at Grafton by the Railway Department is still in hand.

Punts and Ferries.

Maintenance of existing services and new work involved an expenditure of £9,750 from Departmental Votes and £42,632 from Main Roads Board Funds pending transfer to the Board as from 30th June, 1930.

Public Watering Places.

Seven new bores were put down and two new tanks excavated. A number of investigations were carried out. The amount expended on improvements, repairs and maintenance was £18,301 8s. 9d.

RIVER MURRAY AGREEMENT.

The gap in the Spillway has not been raised above the 100,000 acre-feet level pending completion of Victorian Railway Deviations; the remainder of the wall is being built to permit of a temporary storage of 1,250,000 acre-feet with an ultimate extension to 2,000,000 acre-feet.

Contracts for Bethanga Bridge and the Spillway Gates should be completed early in the ensuing financial year.

Work on Lock No. 15, construction and lock site surveys, is still suspended owing to lack of funds.

ELECTRICAL ENGINEERING BRANCH.

No new Hydro-electric Surveys have been carried out.

BURRINJUCK HYDRO-ELECTRIC DEVELOPMENT.

A portion of road between Marilba and Waterview, a distance of 9 miles, is under construction, and when completed there will be a good road of access right to the Dam.

Transmission Lines.

The 205 miles of 66 kV. lines in service have proved satisfactory. Supply was given to the Federal Capital City on 1st September, 1929. The line for supplying Wyangala Dam and Cowra was placed in service during the year. Supplies were given to the towns of Binalong and Bowning.

Negotiations were opened for bulk supplies with Grenfell Municipal Council and Lake George Mining Corporation (Captain's Flat). An agreement was executed with the Temora Municipal Council. Supplies were provided to the Commonwealth Government (Canberra), Cowra, Yass Municipal Council, Water Conservation and Irrigation Commission (Wyangala Dam). Negotiations were also opened for retail supplies to Darby's Falls-Woodstock, Woodstock-Carcoar. Agreements were executed for supplies to Cootamundra-Wallendbeen, Cootamundra-Temora, Binalong-Galong. Guarantees were executed for Galong, Wallendbeen, Stockinbingal, and Darby's Falls. Supplies were provided to Marilba-Bowning-Binalong, Wallendbeen.

Rural Districts supply investigations have been made during the year. Power surveys have been completed for the following districts:—Tarcutta, Tumut-Adelong-Batlow, Darby's Falls-Woodstock-Carcoar, Lachlan Valley below Cowra, Koorawatha-Grenfell, Koorawatha-Morongla, Murrumburrah-Kingsvale, Cootamundra-Temora, Murrumbateman, Bookham, Bethungra, Binalong-Burrowa, Junee-Warre-Warral-Yathella, Stockinbingal.

The trading of the Burrinjuck Electricity Supply for the year showed a marked improvement.

PORT KEMBLA ELECTRICITY SUPPLY.

The new circulating water system, by which the waters of the Harbour are led at sea-level to the basement of the engine-room in the Power House was put into operation, with satisfactory results.

Transmission Lines.

A 33 kV. line connecting the Southern Line at Kiama with the Western Line at Moss Vale was put into service, thus completing a ring main from Port Kembla, via Kiama, Moss Vale and Yerrinbool.

For bulk supplies, negotiations were opened with the Camden and Picton Municipal Councils and the Wollondilly Shire Council, while agreements were executed and supplies provided with the Wingecarribee Shire Council.

Negotiations were opened for retail supplies to Gerringong-Toolijooa-Omega, Jamberoo Village.

Rural District investigations have been carried out and power surveys completed for Gerringong, Berry and South Shoalhaven.

HUME RESERVOIR.

The question of power development is in abeyance pending a decision on the main question of the height to which the Hume Dam will be carried.

WYANGALA DAM.

Tenders have been invited for outlet pipes and gates, and arrangements made for the preparation of the power-station site.

STREAM GAUGING.

The usual stream-gauging operations were carried out.

SYDNEY HARBOUR BRIDGE APPROACHES.

Northern Approach.

The widening of Broughton-street was carried out. The concrete poured during the period was 11,930 cubic yards. A total of 3,770 cubic yards was excavated.

Southern Approach.

Concrete to the extent of 21,442 cubic yards was placed. The 57-ft. arch and the western half of the 64-ft. arch were also poured.

A total of 15,512 cubic yards was excavated, mainly abutments for Argyle-street arch and excavation for railway track tunnels between Grosvenor-street and Argyle-street.

Dorman, Long & Co.'s Contract.

The erection of the main arch was the dominant feature of construction.

A start was made with the construction of the pylons.

The following are the quantities for the masonry and concrete work during the year :—

No. 1 concrete	3,107 cubic yards.
Granite masonry	2,216 "
Four-cut work on granite masonry	13,819 "

The total steel and bronze delivered was 48,900 tons—almost the whole of the material required.

The cost of the bridge and approaches to 30th June, 1930, including land resumptions, interest on construction, &c., was £6,463,943.

The number of men employed on the bridge and approaches was 1,654 as at 30th June, 1930.

GOVERNMENT ARCHITECT'S BRANCH.

Towards the close of the year the Architect's Branch of the Department of Education and of the Department of Public Works were amalgamated; since that date the whole of the combined architectural work has been carried out by this Department.

The expenditure for the year amounted to £492,554 as compared with £594,080 for the previous twelve months.

Original plans prepared for the year numbered 812 and draft specifications, 323; these figures are inclusive of new school buildings at Manly, North Sydney, Parkes, Wingham, Condobolin, Uralla and Ballina, for which working drawings and specifications have been prepared.

Sketch plans were prepared embodying Newcastle Boys' High School, Newcastle Domestic Science School, Western Suburbs Technical High School, Armidale Teachers' College (new section), Temora Intermediate High School, Harcourt Public School (additions), Carlingford new school.

The estimated cost of buildings represented by working drawings, &c., prepared amounted to £288,470 and for sketch proposals, £1,687,870.

Working drawings and specifications were also prepared on behalf of other Departments.

The expenditure in country districts during the year was £207,845 on public buildings and £168,380 on schools.

In the metropolitan division eighty-two contracts have been in progress, the total estimated amount involved being £133,000. The principal building operations were :—Manly Peace Memorial Hospital—Nurses' home and morgue; Royal North Shore Hospital—New home for nurses; Sydney Hospital—New casualty and operating block; Women's Hospital, Crown-street—New infectious block and laundry; Hornsby High School for Girls; Mitchell Library—Dixson wing.

The work in the engineering division has shown an increase both in maintenance and institutional services, but costs have been reduced. The mechanical equipment installed for the casualty and operating block at Sydney Hospital is the largest and most varied in the State.

ENGINEERING DESIGN BRANCH.

The various Engineering Branch Drawing Offices were amalgamated and formed into the Engineering Design Branch, with a principal designing engineer in charge. The Branch prepares designs, specifications and estimates for contracts and engineering works carried out or proposed.

SURVEY DRAFTING BRANCH.

The opportunity was taken on the retirement of the Chief Survey Draftsman to amalgamate the staff engaged in the field on survey work and the drafting staff, and to place them under the Officer-in-Charge of Surveys.

New plans numbered 2,546 and field and level books, 350.

The number of heliographs printed was 36,220, which was somewhat less than in the previous year.

TESTING BRANCH.

The year's operations showed a slight falling off compared with the previous twelve months. Fees amounting to £11,374 were collected.

GOVERNMENT DOCKYARD, NEWCASTLE.

The establishment maintained a good turn-over and was in a satisfactory financial position; the value of the work carried out was £680,000.

The principal manufactured items comprised steel pipes, steel railway carriages, trucks, aluminium swing doors, rail tank waggons, Diesel-driven oil-carrying vessel, Customs vessel for Commonwealth Government, barges, dredge and ship repairs and steel bridge.

FLOATING DOCK.

The floating dock was completed during the year.

GENERAL.

There were few changes of an administrative nature during the period under review, the most important being the appointment of Mr. Evan Smith, F.R.I.B.A., as Government Architect, following the retirement of Colonel R. M. S. Wells. Upon the appointment of Mr. Smith opportunity was taken to reorganise the work of the Government Architect's Branch and rearrange the distribution of supervision of country works under divisional architects.

As in the past, all officers of the Department have rendered loyal and efficient service throughout the year.

G. W. MITCHELL,
Director of Public Works.

Accountant's Report.

For the Year ended 30th June, 1930.

The staff of the Department, and the annual salary charge as at the 30th June, 1930, and the comparison of those with the similar particulars of the previous year will be found in the following :—

Year.	Permanent Officers.		Temporary Officers.		Total.	
	No.	Salary.	No.	Salary.	No.	Salary.
1929-30—		£		£		£
General Staff	400	170,944	303	99,841	703	270,785
Dredge Service	129	40,367	161	43,566	290	83,933
1929-30 totals	529	211,311	467	143,407	996	354,718
1928-29—						
General Staff	420	179,360	349	111,049	769	290,409
Dredge Service	141	44,455	180	49,388	321	93,843
1928-29 totals	561	223,815	529	160,437	1,090	384,252

NOTE.—The foregoing does not include Industrial Undertakings and Government Dockyard staffs. The 1929-30 figures include 23 Permanent and 5 Temporary Officers transferred from the Education Department (Architectural Section).

Following are particulars of the expenditures and receipts of the Department for the year ended 30th June, 1930 :—

	Expenditure.		Receipts.	
	£	s. d.	£	s. d.
1. Consolidated Revenue Fund—				
(a) Salaries and payments in the nature of salaries	149,545	5 0		
(b) Maintenance and working expenses, other than salaries	24,684	8 8		
(c) Maintenance of Public Works and Services, &c.—	£	s. d.		
Roads.....	20,802	14 1		
Bridges.....	38,477	2 4		
Punts, ferries and flood-boats	9,487	19 0		
Public watering-places	18,301	8 9		
Harbours and rivers	26,125	6 11		
Dredge services	178,810	6 11		
Public buildings	73,356	17 3		
Water supply, sewerage, and stormwater drainage	7,197	1 1		
State power supply.....	1,967	7 4		
State telephones.....	25,905	9 9		
Electricity and gas.....	52,749	13 8		
Miscellaneous	35,995	6 7		
	489,176	13 8		
	663,403	7 4		
2. Special Purposes (Revenue) Fund—				
Purchase of motor vehicles	1,461	14 2		
Bridges.....	1,413	8 6		
Public watering-places	2,511	16 11		
Harbours and rivers	1,179	15 0		
Public buildings	15,413	16 4		
Punts and ferries	112	3 0		
	22,092	13 11		
3. General Loan and Loans Expenditure Suspense—				
Bridges.....	1,405,286	4 0		
Harbours and rivers	142,912	19 4		
Public watering-places	9,885	8 11		
Water supply works	365,031	2 2		
Sewerage and stormwater drainage works.....	488,034	6 2		
Public buildings	219,242	1 1		
Electrical works.....	103,821	6 8		
River Murray Commission—				
State contribution to their funds—Purchase of plant, &c.	209,151	8 0		
Sales, &c., of No. 1 Plant.....			6,040	8 3
Plant depreciation charge			13,515	10 0
Miscellaneous	1,420	5 10		
	2,935,835	2 2	19,555	18 3

Particulars of Expenditure and Receipts for Year ended 30th June, 1930—continued.

4. Special Deposits Account.	Balance at 1st July, 1929.	Receipts.	Total.	Expenditure.	Balance at 30th June, 1930.
Name of Account.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Public Works Stores Advance Account	87,323 3 0	104,521 17 3	191,845 0 3	105,263 3 4	86,581 16 11
Sydney Harbour Bridge—Municipal and Shire Rates Account	358,046 14 8	.....	358,046 14 8	279,080 1 10	78,966 12 10
Junece Water Supply	2,636 2 10	11,832 0 4	14,468 3 2	13,699 2 9	769 0 5
Do Renewal Account	7,613 17 6	1,217 18 3	8,831 15 9	.....	8,831 15 9
Broken Hill Water Supply	57,242 16 2	62,620 19 4	119,863 15 6	54,689 15 10	65,173 19 8
Bethunga Water Supply	216 14 5	199 4 6	415 18 11	6 5 3	409 13 8
Medlow Bath Water Supply	75 0 2	286 1 6	361 1 8	329 18 11	31 2 9
Water supplied to Shipping at Port Kembla	383 18 5	155 12 6	539 10 11	539 10 11	.....
Public Works Department Working Account	15,289 19 7	33,991 7 9	49,281 7 4	41,530 1 11	7,751 5 5
Public Works Department Suspense Account—					
General	1,022 9 11	38 5 6	1,060 15 5	585 8 2	475 7 3
Main Roads Board	181,394 11 3	.....	181,394 11 3	164,701 14 10	16,692 16 5
Lands Department	9,284 7 4	.....	9,284 7 4	8,619 17 2	664 10 2
Burrinjuck Hydro-Electric Undertaking	5,145 2 1	56,601 3 3	61,746 5 4	54,917 2 5	6,829 2 11
Port Kembla Electricity Undertaking	1,978 9 6	71,417 17 2	73,396 6 8	70,435 2 8	2,961 4 0
Coal Loading and Shipping at Port Kembla	3,736 6 2	43,695 14 6	47,432 0 8	35,075 16 9	12,356 3 11
Lighting and Heating all Departments	106 5 1	4,679 4 11	4,785 10 0	4,491 9 7	294 0 5
Leichhardt Depot Working Account	1,294 16 7	25,724 11 9	27,019 8 4	23,817 2 9	3,202 5 7
Testing Branch Working Account	2,328 8 0	13,090 0 0	15,418 8 0	12,147 19 1	3,270 8 11
Security Deposit Account	18,774 8 0	19,575 6 3	38,349 14 3	27,302 8 2	11,047 6 1
Unclaimed salaries and wages	1,182 5 6	1,470 4 5	2,652 9 11	1,563 0 2	1,089 9 9
Unclaimed moneys	155 15 0	217 10 9	373 5 9	217 19 9	155 6 0
State Sawmills	508 14 5	1,873 3 0	2,381 17 5	51 0 2	2,330 17 3
State Timber Yards	1,670 5 4	114 17 3	1,785 2 7	.....	1,785 2 7
State Brickworks, Botany .....	.....	250 4 10	250 4 10	.....	250 4 10
Advances to Officers to purchase motor cars .....	.....	66 13 4	66 13 4	.....	66 13 4
	£ 757,410 10 11	453,639 18 4	1,211,050 9 3	899,064 2 5	311,986 6 10

5. Operations on other Departments' Loan, Revenue, Special Purposes, and Special Deposit Accounts to meet Expenditure on Works carried out for them—

	Expenditure. £ s. d.	Receipts. £ s. d.
Loan votes	87,976 12 1	100,000 0 0
Consolidated Revenue Votes—		
Relief works for unemployed	148,998 11 10	
Treasurer's Advance Account	580 13 6	
Other Revenue Votes	12,581 2 11	
Special Purposes (Revenue) Votes	162,160 8 3	
Special Deposits Accounts	18,495 4 7	
	5,505 4 10	
	£274,137 9 9	£100,000 0 0

6. Payments made by other Departments for Works and Services carried out by this Department—

Department.	Expenditure.	Receipts.
Agriculture	1,844 16 0	
Government Insurance	1,666 10 2	
Health	55,320 8 7	
Hospitals Commission	92,122 6 8	
Labour and Industry	10,755 9 1	
Lands	3,601 15 1	
Family Endowment	907 6 8	
Metropolitan Water, Sewerage and Drainage Board	510 11 10	
Public Library	410 1 10	
Resumed Properties	488 18 3	
River Murray Commission	320,046 8 0	25,485 17 1
Sydney Hospital Committee	11,674 14 2	
Water Conservation	3,212 9 5	
Taxation Department	965 15 0	
Sydney University	2,329 6 4	
Education	*1,782 7 2	
Miscellaneous	1,282 4 7	
	£508,921 8 10	£25,485 17 1

7. Revenue Received and Paid into Consolidated Revenue—

Re-payments made to previous year's Consolidated Revenue Votes	15,553 18 10
Rents, exclusive of land	6,680 18 7
Miscellaneous services rendered	13,084 14 7
Unclassified receipts	257,236 18 11
Exchange on remittances	79 9 9
Fees	2 1 0
	£292,638 1 8

* In addition, work of the value of £173,050 2s. 1d. has been carried out in districts outside the metropolitan area for the Department. This expenditure, although the work is directed and supervised by the Departmental Officers, does not go through Head Office Books.

JAMES ROBERTSON,
Accountant.

The Director.

Water Supply and Sewerage Branch.

Report for year ended 30th June, 1930.

(A) GENERAL REPORT

- (1) Water Supply and Sewerage Generally.
- (2) Water Supplies administered by the Department.
- (3) Expenditure for Year.
- (4) Legislation.
- (5) Staff and Administration.

(1) WATER SUPPLY AND SEWERAGE GENERALLY.

At the end of the year public water supplies constructed at a capital cost of £3,628,779 were in operation in eighty-one towns.

The total capital cost of the sewers and stormwater channels amounts to £969,405. The cities and towns in the Metropolitan and Hunter districts are not included in these figures.

The rainfall in July, 1929, was generally below the average. In August the northern part of the State had less and the southern more than the average. In September the rainfall of the whole State was generally below the average and in October and November the western parts of New South Wales were below the average.

From December, 1929, to May, 1930, the rainfall of the whole State was much under the average, but in June good falls were general nearly everywhere.

The existing country towns water supplies generally were adequate to meet the requirements during the drier portions of the year, but in Parkes, Goulburn, Orange, Dabbo and Mudgee restrictions had to be imposed.

During the year the earth dam at Portland became depleted and the town had to fall back on a supply pumped from the Commonwealth Cement Company's bore. Early in 1930, however, following good falls, the dam was again put into service.

Excepting for a short period during October and November, 1929, when restrictions were imposed, the water supply at Broken Hill was adequate for demands.

Works of water supply were brought to completion in 24 towns, and at 3 Government institutions during the year.

At 30th June, 1930, water supply works were in progress in 13 towns of which 5 were schemes for areas not previously served.

Investigations of new schemes of water supply were carried out in 8 areas and in 7 towns for the augmentation of existing supplies.

The sewerage of Forbes was in progress.

The augmentation of sewerage facilities was in progress in 8 towns.

WATER SUPPLIES ADMINISTERED BY THE DEPARTMENT.

For the two supplies administered by the Department the corresponding period is the twelve months ending 31st December in each year.

(a) BROKEN HILL WATER SUPPLY.

The total quantities of water pumped from the two storage reservoirs were :—

	Gallons.
Umberumberka	291,056,000
Stephens Creek	330,096,000
Total	621,152,000

The average cost of pumping was approximately :—

Umberumberka	6.45d. per 1,000 gallons.
Stephens Creek	8.3d. per 1,000 gallons.

The average for the two was about 7.435d. per 1,000 gallons.

(b) JUNEES WATER SUPPLY.

Pumped at Tenandra. Gallons.	Cost per 1,000 gallons to Railway Commis- sioners and Junees Council.	Supply from Bethungra to Railway Commissioners.	
		Gallons.	Cost per 1,000 gals.
122,183,000	26.4114d.	127,711,185	8d.

EXPENDITURE FOR YEAR.

Water Supply Works	£457,199 15 2
Sewerage Works	523,137 18 5
Total	£980,337 13 7

B. DETAIL REPORT.

(I) WATER SUPPLY.

(a) Country Towns Water Supply.

1. Works completed.
2. Works under construction.
3. Works proposed and investigations.

(II) SEWERAGE.

(a) Newcastle Sewerage and Stormwater Channels.

(b) Country Towns Sewerage and Stormwater Channels.

1. Works completed.
2. Works under construction.
3. Works proposed and investigations.

(III) WATER SUPPLY AND SEWERAGE.

Treatment and purification and general investigation.

(a) Country Towns Water Supply.

(I) WORKS COMPLETED.

Bega.—A scheme for the town of Bega was completed during the year: consisting of concrete suction and machinery wells, suction and rising mains, pump-house, electrically-driven pumping machinery in duplicate with capacities of 15,000 and 9,000 g.p.h. respectively, reinforced concrete service reservoir with a capacity of 370,000 gallons, a service main and reticulation.

The construction of the service reservoir was carried out by the State Monier Pipe Works, the balance of the work being performed under private contract. The total cost of the scheme was £25,533 to 30th June, 1930.

Bowral.—An additional electrically-driven pump with a capacity of 14,400 g.p.h. was installed during the year at a cost of £337 to 30th June, 1930.

Forbes.—Additional reticulation was carried out by the Council with materials provided by the Department, the total cost being £2,305 to 30th June, 1930.

Gloucester.—A scheme was completed for the town during the year, and consisted of the following:—A pump station situated on the Gloucester River with a suction main and staging, a pump-house, pump well and machinery, rising main, reinforced concrete service reservoir with a capacity of 125,000 gallons, and reticulation.

The pumping machinery, which is electrically driven, is in duplicate, having a capacity of 15,000 and 9,000 g.p.h. respectively. The service reservoir was constructed by the State Monier Pipe Works, and the balance of the work was done by private contract. The cost of the whole scheme was £18,648 to 30th June, 1930.

Goulburn.—A concrete dam with a storage capacity of 400,000,000 gallons was erected on Sooley Creek above the existing storage dam, to augment the present supply. The work was carried out by contract at a cost of £35,868 to 30th June, 1930, and has proved of great benefit to the town.

Gundagai.—Additional reticulation was laid by the Council during the year with material supplied by the Department, the total cost being £1,302.

Hay.—Two electrically-driven pumps were installed in a new pump well and engine house, each having a capacity of 15,000 g.p.h., and alterations and additions to the suction and rising main were carried out by day labour. The total cost of the work was £5,792 9s. 6d. to 30th June, 1930.

Inverell.—A scheme for the town was completed during the year consisting of the following:—Two electrically-driven deep well pumps, each with a capacity of 11,000 g.p.h., also two electrically-driven booster pumps, which lift the water through an 8-inch combination rising and service main to two concrete service reservoirs with combined capacity of 600,000 gallons.

The pipe laying for the rising main and reticulation was carried out by the Council by day labour with material supplied by the Department. The pumps were supplied and installed by contract, the two service reservoirs having been constructed in 1917 by day labour as part of the original Gwydir River scheme, which was subsequently closed down.

The total cost of the scheme was £53,675 to 30th June, 1930.

Junee.—The laying and jointing of the additional gravitation main from Tenandra to Junee, comprised of 12-inch cast iron cement lined pipes, was completed at a cost of £119,921 to 30th June, 1930, the total length of the main being about 18 miles.

Lithgow.—Two additional concrete pipehead weirs were erected on Middle River and Pipehead Creek immediately downstream of the existing pipeheads, and to a higher level than the latter, for the purpose of conserving a larger quantity of water for the town of Lithgow.

They were completed at a cost of £7,514.

Lismore.—Additional works were carried out at the pumping station, consisting of pumping plant in two units each having a capacity of 54,000 g.p.h.

Also an engine house, pump well, transformers, switchgear and cables, and a new 15-inch rising main, two 12-inch suction mains with additions to suction staging. The total cost of the work was £49,061 to 30th June, 1930.

Mittagong.—A second electrically-driven pumping unit with a capacity of 15,000 g.p.h. was installed at a cost of £559 to 30th June, 1930.

Moree.—An additional reinforced concrete service reservoir with a capacity of 100,000 gallons was erected by the State Monier Pipe Works to augment the town supply, and additional reticulation was laid to meet increased settlement, at a total cost of £5,080.

Moss Vale.—Additional mains were laid by the Council with material supplied by the Department, the total cost being £4,781 1s. 0d.

Mudgee.—An electrically-driven pump with a capacity of 8,000 g.p.h. was installed to supersede the old steam plant, and a booster pump was provided to increase the pressure sufficiently to enable water to be delivered into No. 2 Storage Reservoir. The total cost was £1,902 to 30th June, 1930.

Murwillumbah.—The reticulation was extended by day labour, the Council carrying out the work with material supplied by the Department at a cost of £3,108.

Narromine.—A complete scheme for the town was carried out during the year: consisting of suction main and staging, pump-house and well, two electrically-driven pumps of 12,000 and 6,000 gallons per hour capacity respectively, rising main, reinforced concrete service reservoir with a capacity of 125,000 gallons, service main, and reticulation.

The whole of the work was carried out by contract, the service reservoir being erected by the State Monier Pipe Works and the balance by private contractors, at a total cost of £27,810 to 30th June, 1930.

Orange.—Extensive additions were carried out to the reticulation system during the year at a cost of £16,270 17s. 5d.

Parkes.—An additional concrete service reservoir with a capacity of 1,000,000 gallons was erected by contract at a cost of £8,448, and a portion of the gravitation main from the Bumberry Storage was replaced with larger cast-iron pipes by the Council with materials supplied by the Department at a cost of £8,089.

Penrith.—New 9-inch cast-iron mains were laid along High-street under each footpath from the pumping station to the service reservoir by day labour, to enable the Main Roads Board to surface the street with concrete. The total cost of the work was £12,764.

Singleton.—An additional concrete service reservoir with a capacity of 750,000 gallons, and a branch trough to water softener, and connection to service reservoir were carried out by contract. The total cost being £5,639 to 30th June, 1930.

Tumut.—An electrically-driven vertical borehole pump, having a capacity of 13,200 gallons per hour, was installed to take the place of the steam plant. A new 8-inch rising main to the service reservoir and an additional 12-inch inlet pipe from the river were also provided.

Wagga.—Additional reticulation was carried out by the Council with materials supplied by the Department, at a cost of £7,386.

Wyang.—A scheme for this town was completed by contract during the year at a cost of £18,580 to 30th June, 1930.

The work consisted of a pumping station situated on the left bank of Wyong Creek, about a mile west of the town, with electrically-driven pumps in duplicate; each set when working singly capable of pumping 6,000 gallons per hour, or 10,000 gallons per hour when working together. Also a rising main, a concrete service reservoir with a capacity of 200,000 gallons, and reticulation.

Gosford Farm Home.—This supply was augmented and improved during the year by the construction of a small concrete pipehead weir on Pile's Creek, with a pumping station and pumping machinery: consisting of electrically-driven pumps in duplicate, each having a capacity of 2,400 gallons per hour, a rising main, concrete service reservoir with a capacity of 50,000 gallons, and a transmission line.

Rabbit and Milson Islands Mental Hospital.—The construction of the improved scheme for this institution was completed during the year. These improvements consisted of a curved concrete storage dam on the mainland, with a capacity of 8,000,000 gallons, which was carried out by day labour, and the erection of a reinforced concrete service reservoir, with a capacity of 100,000 gallons, which was carried out by the State Monier Pipe Works on Milson Island. The total cost of these improvements was £8,091 to 30th June, 1930.

Scheyville Training Farm.—An improved supply to the farm was completed during the year, consisting of a small pumping station on the Hawkesbury River with pumping machinery driven by kerosene, pumping through a 4-inch rising main to a reinforced concrete service reservoir, with a capacity of 47,000 gallons.

The machinery, which was obtained by contract, was installed by the Department, the rising main being constructed by day labour and the service reservoir by the State Monier Pipe Works.

The total cost of the scheme was £3,478 to 30th June, 1930.

(II) WORKS UNDER CONSTRUCTION.

Bathurst.—An additional reinforced concrete service reservoir with a capacity of 2,000,000 gallons was commenced under contract by the State Monier Pipe Works to augment the supply, principally to the high levels of the town. A connection to the existing reticulation is being carried out by day labour.

Bowral.—An additional concrete service reservoir of the banked type with a capacity of 400,000 gallons is being constructed by the Bowral Council with money advanced by the Department.

Cargelligo.—This scheme, which was commenced in the previous year, was completed with the exception of the filtration plant, which is now being installed. The water will be pumped from Lake Cargelligo by electrically-driven pumps in duplicate with capacities of 6,000 and 3,000 gallons per hour respectively. A booster pump is also being installed to increase the pressure in town mains.

Deniliquin.—Two electrically-driven pumps to take the place of the existing plant are being installed, having capacities of 30,000 and 18,000 gallons per hour respectively with transmission line and substation. A new pump-well, suction main and staging are also included in the work.

Glen Innes.—A filtration plant for the treatment of the water is being installed by the State Monier Pipe Works under contract.

Grenfell.—A scheme for a complete water supply for the town was commenced by day labour. The scheme consists of an earth dam with a concrete core at Bogolong Creek, a pump station, rising main, service main, service reservoir and reticulation.

Grafton.—An additional 10-inch steel Mannesman subaqueous main across the Clarence River between Grafton and South Grafton is being laid by the Grafton Water Board by day labour.

Junee.—Electrically-driven pumps in duplicate, each set consisting of a high level and a low level pump with a capacity of 40,000 gallons per hour, are being installed in a new pump well to take the place of the existing steam plant. A new suction main and staging and a steel rising main to existing service reservoir are also being constructed.

Morisset Mental Hospital.—The work of raising the dam at Morisset is being carried out by day labour.

Orange.—An additional storage reservoir consisting of an earth bank with a concrete core wall and having a capacity of 660 million gallons is being constructed by contract on Gosling Creek to augment the present supply to the town. A filtration plant is also being erected by the State Monier Pipe Works for the purpose of treating the water, together with all necessary piping, &c., to connect up to the present system.

Scone.—A water supply for the town is under construction by contract and consists in a pump well, pump house, and machinery, rising main and reticulation and a concrete service reservoir with a capacity of 300,000 gallons.

South-west Tablelands.—A scheme was commenced during the year for a water supply to the towns of Cootamundra, Murrumburrah-Harden, Young, Stockinbingal, Temora, Wyalong and West Wyalong, water being pumped from the Murrumbidgee River at Jugiong.

Work is in progress on Nos. 1 and 2 pumping stations, which is being carried out by contract. A filtration plant is also in course of construction by contract by which the water will be treated before being pumped through the rising main which consists of 22-inch steel Mannesmann pipes, the main being about 10 miles in length. These pipes are being manufactured by the Government Dockyard at Newcastle, and are being laid and jointed by contract. Two concrete settling tanks are under construction having a capacity of 750,000 gallons each. A 16-inch steel gravitation main about 10 miles in length is being laid from the settling tanks to a concrete service reservoir with a capacity of 650,000 gallons, which is to serve the town of Cootamundra. The ultimate capacity of the pumping plant will be 4,800,000 gallons per day.

Stockton Mental Hospital.—A reinforced concrete elevated tank is under construction by the State Monier Pipe Works.

Taree-Wingham.—The construction of a cottage for the pumping engineer is being carried out by contract.

Tenterfield.—A scheme for the town is approaching completion. This is being carried out by day-labour and consists of a concrete storage dam on Tenterfield Creek with a capacity of 180 million gallons; a pumping station below the dam with two electrically-driven pumps having capacities of 20,000 and 15,000 gallons per hour respectively; cast-iron suction and rising mains; a concrete service reservoir with a capacity of 450,000 gallons; a service main and reticulation.

Waterfall Hospital.—An additional reinforced concrete water tower with a capacity of 250,000 gallons is in course of construction by the State Monier Pipe Works.

Werris Creek.—A scheme for the town and to serve railway requirements is in progress and consists of a curved concrete dam on Quipolly Creek, having a capacity of 150 million gallons; a 12-inch cast-iron gravitation main; a concrete service reservoir with a capacity of 1,000,000 gallons; a service main and reticulation.

(3) WORKS PROPOSED AND INVESTIGATIONS.

Proposals were investigated for the augmentation or improvement of the water supplies at—

Cowra, Kiama, Nowra, Portland, Queanbeyan, Quirindi, and Tamworth, and the provision of supplies to—

Barraba, Bemboka, Bermagui, Cobargo, Coolamon, Ganmain-Marra-Matong, Moruya, and Mungindi, was inquired into.

Extensive boring was carried out in connection with Dubbo water supply augmentation with very satisfactory results.

(a) NEWCASTLE SEWERAGE AND STORMWATER CHANNELS.

Newcastle Sewerage Amplification.

A preliminary estimate, following survey, in respect of the extension of the main sewer to North Waratah, has been prepared and submitted to the Engineering Experts Committee.

Deep Sinking :—

Air Line Shafts.—Now complete to Scholey-street. All shafts have been sunk to invert level.

Tunnelling.—7,696 cubic yards of rock have been excavated during the year, making a total of 11,196 cubic yards to date.

Shallow Sinking.—

Shafts.—All shafts have been sunk to invert level.

Tunnelling.—12,486 cubic yards of O.T.R. have been excavated during the year. Total to date 22,602 cubic yards.

Concreting.—5,303 cubic yards have been completed in tunnel during the year. Total to date 5,303 cubic yards.

Open Cut.—Partly completed from Newtown-road to Scholey-street.

Total Cost to 30th June, 1930—£240,869.

NEWCASTLE STORMWATER DRAINAGE.

Cottage Creek Stormwater Drainage System.

Surveys for land acquisition are in hand for the main channel and sports ground branch.

Plans and descriptions, in connection with the transfer to the Hunter District Water Supply and Sewerage Board, have been supplied to head office.

The construction work is now complete.

Total cost to 30th June, 1930—£225,492.

Throsby Creek Stormwater Drainage System.

This scheme was passed by the Public Works Committee in March. Resumption and easement surveys are completed for present requirements. The system, as a whole, is about one-half completed.

Main Channel.—Completed from gasworks to end of contract.

Excavation—Labour	...	...	...	...	...	...	70,001 cubic yards.
" with dredge	...	...	...	...	...	...	46,205 "
Filling	...	...	...	...	...	...	36,824
Rubble	...	...	...	...	...	...	2,775
Concrete	...	...	...	...	...	...	9,989 "

Lewis-street Bridge—Piers and abutments nearly complete.

Total cost (Main Channel) to 30th June, 1930—£113,155.

*Throsby Creek Stormwater Drainage System.**Branch Channels.*

Griffiths Flat.—Completed.

Hamilton Branch.—Complete to railway from Throsby Creek.

Orchardtown Branch.—Complete.

Styc Creek Branch.—Complete from Tudor-street to railway.

Henley-street Branch.—Excavation complete and a small amount of concrete placed.

Newtown Branch.—Completed.

Georgetown Branch.—Bridge at Christoe-road has been constructed.

Adamstown Branch.—Practically complete to Victoria-street from Throsby Creek.

The following work has been carried out :—

Excavation in trench	...	...	...	...	...	...	19,501 cubic yards.
" open cut	...	...	...	...	...	...	52,885 "
Filling	...	...	...	...	...	...	5,471 "
Concrete in open cut	...	...	...	...	...	...	6,368 "
" open trench	...	...	...	...	...	...	3,691 "
" box section	...	...	...	...	...	...	824 "

Total cost (Branch Channels) to 30th June, 1930—£112,906.

Carrington Sewerage.—A revision of the detail survey is in progress, and boring has been carried out at four selected sites for pumping stations in connection with the sewerage design.

Cardiff Sewerage.—A report has been drafted for submission by the Engineering Experts Committee to the Hunter District Water Supply and Sewerage Board, together with preliminary estimate of cost.

Cessnock Sewerage.—Engineering, detail and land surveys are in progress. The following work has been carried out during the year :—

Main sewers Nos. 1, 2, and 3, and Branches.

Laying and jointing	6-in E.W. pipes	...	...	...	...	...	40,697 feet.
"	"	9-in. "	...	...	...	...	3,939 "
"	"	12-in. "	...	...	...	...	2,190 "
"	"	15-in. Concrete pipes	...	...	...	...	2,019 "
"	"	18-in. E.W. pipes	...	...	...	...	6 "
"	"	21-in. Concrete pipes	...	...	...	...	221 "
"	"	30 "	...	...	...	...	2,387 "

232 manholes have been constructed.

The excavation for the pump-well was completed and concreting was in hand at the end of the period.

Total cost to 30th June, 1930—£80,435.

Stockton Mental Hospital Sewerage.—The sewerage scheme comprising reticulation, pump-well, septic tanks and effluent trough is now complete, the total cost being £9,766 17s. 1d.

(b) Country Towns Sewerage and Stormwater Channels.

(1) WORKS COMPLETED.

Albury.—The sewerage extensions which were commenced by day labour in the previous year were completed at a cost of £41,968 to 30th June, 1930.

The work comprised large reticulation extensions; also extensions to the treatment works consisting of the installation of Kremer Kusch tanks, sludge drying beds, and rotary filters.

Bathurst.—The extensions to the existing system comprising the sewerage for the low levels were completed by day labour at a cost of £29,790 to 30th June, 1930.

Goulburn.—The construction of the sewers and pumping station for the Ifield, show ground and sports ground low level areas were completed by day labour at a cost of £45,601 to 30th June, 1930.

Lithgow.—Additional reticulation was completed at a cost of £5,622.

Narrandera.—Reticulation extensions were carried out by the Council with material supplied by the Department. The total cost was £3,621.

(2) WORKS UNDER CONSTRUCTION.

Bathurst.—Alterations to the treatment works to provide for more efficient purification of the sewage.

Forbes.—A complete scheme consisting of two low level pumping stations, treatment works, and reticulation. The work is being done by day labour.

Goulburn.—Extensive additions to the treatment works.

Lismore.—A reticulation system in North and South Lismore by contract by the State Monier Pipe Works.

Narrandera.—Further extensions to the sewerage system. These are being carried out by day labour.

Orange.—Extensions of the reticulation to Bletchington, Warrendine, Endsleigh, Glenroy and to the mental hospital are almost completed. The work is being carried out by day labour.

Wagga.—Extensions to the reticulation in Nos. 3 and 4 Districts, two ejector stations and a pump station are being carried out by contract by the State Monier Pipe Works. New machinery was installed in No. 1 pump station.

(3) WORKS PROPOSED AND INVESTIGATIONS.

Preliminary designs for Armidale sewerage and Quirindi sewerage were completed and submitted to councils.

Proposals were investigated for additional works at the following towns:—Albury, Goulburn, Orange and Narrandera.

Proposals for sewerage schemes at Moss Vale and Warren are being investigated and designed.

(III) WATER SUPPLY AND SEWERAGE—TREATMENT AND PURIFICATION, AND GENERAL INVESTIGATION.

Water Supply.—Tenders were let early in the year for the construction of filtration plants at Glen Innes and Lake Cargelligo. In each case the concrete construction is being carried out by the State Monier Pipe and Reinforced Concrete Works, the mechanical equipment being supplied by the Filtration and Water Softening Co. of Melbourne. Construction has proceeded satisfactorily and the plants should be ready for operation in July, 1931.

Designs and specifications were prepared and tenders let for the construction of filtration plants for the South West Tablelands scheme at Jugiong; for the Orange water supply and the Wellington water supply. The two former will have a capacity of 90,000 gallons and the latter 40,000 gallons per hour.

Designs and estimates were also prepared for filtration plants for the Dangog and Forbes water supply.

The third filter unit has been installed at Bowral, and tests of the plant operation over the past twelve months show that it has given results well above specifications.

The chlorination plant has been in continuous operation treating the well water at Singleton, and has given every satisfaction.

An emergency chlorination plant was operated at Cootamundra for a few weeks on a temporary supply.

Inspections of the catchment areas of the Molong, Taree-Wingham and Tenterfield Water Supplies were made in conjunction with officers of the Health Department and reports furnished on the quality and treatment of the water and the areas to be declared a catchment district.

The bacteriological investigation of the Blackheath Water Supply was completed and its condition found to be satisfactory.

Murray River.—During midsummer, complaints were received from Albury and Corowa of objectionable tastes and odours in the Murray River water.

An examination showed that the Hume Reservoir was badly infected with algæ, Anabena, and copper sulphate treatment of the whole reservoir was recommended. This was carried out in conjunction with the officers of the Victorian State Rivers and Water Supply Commission, and the trouble disappeared at the end of January.

In all about 22 tons of copper sulphate were used, the total cost of treatment amounting to £1,060.

This infestation of algæ was certainly the most serious of its kind which has occurred in the history of water supply in Australia and caused great personal inconvenience in both New South Wales and Victorian towns drawing their supply from the river below the Hume Reservoir.

Sewerage.—A preliminary investigation with report and estimate was made on sewerage schemes for the towns of Blackheath and Corowa and a similar report is in preparation for Canowindra and the Morisset Mental Hospital.

The proposed treatment works site at Bowral was further investigated in conjunction with officers of the Board of Health and amendments recommended.

The bacteriological investigation in connection with the pollution of Merewether beach by the Newcastle sewerage was completed and a report submitted with regard to the treatment considered advisable at the proposed works at Murdering Gully.

Designs for the treatment works for Forbes and Bathurst were finalised and the works are now under construction.

The alterations to the Goulburn plant necessary to convert the old septic tank into the sedimentation with separate sludge digestion system will be completed at an early date.

The Imhoff tank and new trickling filters with rotary sprinklers in place of the old tipping trough at Wagga were put into operation and gave a greatly improved effluent in comparison with that from the septic tank treatment.

The additions to the Albury treatment works consisting of a sedimentation tank with separate sludge digestion unit were completed and are in successful operation.

Sufficient house connections have been made at Dubbo to ensure a reasonable flow of sewerage to the treatment works and operating tests have proved satisfactory.

In order to obtain the latest information in connection with the activated sludge plant for Bathurst a visit was made to Geelong, Colac and Ballarat by an officer of the Department and a report furnished on the Simplex Aeration plant.

Reports and estimates have been made on sewage installations for the following hospitals:—Lower Clarence, Cargelligo, Camden, Muswellbrook, Grenfell, Kiama, also Wombeyan Caves House and Boolaroo Public School.

The sewage treatment works at Orange, Bathurst, Lithgow, Goulburn, Hay, Narrandera, Wagga, Albury, Katoomba, Tamworth, and Dubbo have been visited regularly by the Departmental Inspector, the effluent sampled and analyses made by the Health Department, and advice tendered the councils generally re the management of the plants.

HERBERT FLEMING, M.I.E. (Aust.)
Chief Engineer for Water Supply and Sewerage.

Harbours, Roads, and Bridges Branch.

Annual Report 1929-30.

TOTAL EXPENDITURE.

The total expenditure on construction and maintenance of harbour works, dredging, roads, bridges, ferries, public watering-places, &c., amounted to £919,651 2s. 10d., as detailed hereunder —

	£	s.	d.
Harbour works (including dredging)	455,380	11	0
Roads	271,712	9	11
Bridges	109,435	10	3
Punts and ferries	52,382	8	1
Public watering-places	30,740	3	7
	£919,651	2	10

LOCAL GOVERNMENT INQUIRIES.

Local Government inquiries totalling 69 were conducted by officers of the Branch for the Department of Local Government, including 64 applications from councils for loans totalling £1,264,025.

INSPECTIONS FOR WATER RIGHTS.

Inspections in connection with water right applications and the supervision of shallow bores in the Western Division were again carried out for the Water Conservation and Irrigation Commission.

HARBOUR WORKS.

The major improvement works at Port Kembla, Newcastle, and Coff's Harbour were continued by day labour, and 300-feet extension of No. 4 Jetty, Port Kembla, by day labour was completed during the year. Particulars of these works are detailed later.

During the year the following larger repairs and extensions were carried out :—

Tweed River	Repairs to spur wall and southern training wall.
Byron Bay	Repairs to new jetty following on storm damage and strengthening of jetty by additional piles and bracing.
Richmond River	Construction of new Crane Wharf at Riley's Hill for 10-ton crane.
Clarence River	Enlargement of Ashby Dock.
Woolgoolga Jetty	General repairs to existing jetty and moorings.
Coff's Harbour Jetty	do do do
Nambucca River	Repairs to main training wall and Stewart Island block dam.
Macleay River	Training wall repairs.
Port Kembla	No. 4 Jetty extension and general maintenance to jetties.

Owing to the limited funds available rationing was introduced during the year on certain of the day labour works in order to distribute employment as far as possible.

DREDGING.

Of the new dredging plant under construction at the end of the year 1928-29, the following was completed and placed in commission during the year :—

New 14-inch all-electric suction dredge "Zeno." Two 130-ton hopper punts.

The following new dredging plant was still under construction at the end of the year :—

New 14-inch suction bar-hopper dredge "Hermes."

New steel single-screw bucket dredge "Pluto."

Conversion to all-electric of dredge "Tempe."

The quantity of material lifted during the year totalled 4,209,142 tons, at a cost of 12·57d. per ton, as compared with 12·77d. per ton the previous year.

Particulars of bar and crossings of the various river entrances are shown in Statement "D."

RIVER ENTRANCES.

During the year most of the river entrances were visited by the bar dredges. The entrances were maintained at a fairly satisfactory depth considering the time the dredges were available for each port.

GENERAL MAINTENANCE.

The expenditure (excluding dredging and major construction works separately referred to) on the maintenance of the various harbour and river works and ocean jetties amounted to £26,125 6s. 11d.

DOCKS.

The transactions of the docks at the Tweed, Richmond, Clarence and Manning Rivers are detailed in Statement "E."

HYDROGRAPHIC SURVEYS.

Re-surveys of Lake Macquarie entrance, Coff's Harbour, Floating Dock Basin (Newcastle), Port Kembla Harbour, Bellinger, Richmond and Camden Haven River entrances were completed during the year.

Dredging surveys in the various districts were also carried out.

INLAND RIVERS.

Snagging operations on the Rivers Murray and Darling were carried out during the year at a cost of £618 13s. 3d.

BOURKE LOCK AND WEIR.

The expenditure in maintenance and repairs amounted to £164 5s. 3d. on lock and weir and £147 15s. 11d. on wharf.

No shipping was recorded during the year.

SWAMP DRAINAGE.

Twenty-seven Trusts and twenty-two Unions were in operation at the close of the year. Grahamstown-Campvale Drainage Trust was dissolved and reconstituted as a Union, and a petition for the formation of a Drainage Union at Central Ulmarra was granted after full inquiry. Petitions for the formation of Drainage Unions at Oxley Island, North Oxley Island, Calliope (Clarence River), and Marriott (Macleay River) were received, but no decision was reached by the end of the year.

Heavy rains were experienced on the majority of the North Coast Trusts during the latter half of the year, but little, if any, damage was suffered owing to the generally satisfactory condition in which drains and other Trust works were maintained.

During January and February, 1930, inquiries were held in regard to the financial position of Tuckean and Shark Creek Drainage Trusts.

TWEED RIVER.

Repairs to spur wall and southern training wall were carried out at a cost of £579 10s. 1d.

BYRON BAY.

Repairs and maintenance of new jetty and moorings were carried out during the year at a cost of £900 3s. 8d., including an amount of £99 19s. 3d. for repairs to storm damage commenced during the previous year. An amount of £2,001 4s. 9d. was expended in additional piles and bracing for the purpose of strengthening the sea end of this jetty against further damage by gales.

Two 3-ton steam cranes were dismantled and removed from the old jetty at a cost of £176 2s. 7d.

RICHMOND RIVER.

Construction of a new wharf at Riley's Hill for 10-ton crane was commenced, and work was still in progress at the end of the year. Expenditure during financial year under review was £1,048 4s. 11d.

CLARENCE RIVER.

The 30-feet extension of Ashby Dock was commenced and was still in progress at the end of the financial year, the expenditure during the year being £344 5s. 10d.

WOOLGOOLGA JETTY.

The expenditure on the maintenance of the jetty amounted to £1,650 12s. 7d. and included renewal of piles, girders, capwales, fenders and decking. Buoys and moorings were overhauled and defective cables replaced.

COFF'S HARBOUR.

The construction works in connection with the eastern breakwater were continued throughout the year.

Construction expenditure	...	...	...	...	...	...	...	...	£39,055 1s. 1d.
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Tonnage of stone quarried	...	...	...	...	...	...	...	...	52,654 tons.
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Eastern Breakwater.—Extended 157 feet to chainage 512 feet. Heavy gales on two occasions during the year damaged the wall considerably but damage has been repaired and satisfactory progress has been made.

During the year 16,885 tons of stone were deposited, costing £8,287 14s., making a total of 152,922 tons to date, costing £107,342 10s. 8d.—14/0·46 per ton.

Concrete Work.—The construction of 40-ton concrete blocks was continued on a large scale; 622 blocks were tipped on the sea side and centre of breakwater at a cost of £18,893 7s. 2d. 258 tons of concrete were placed on top of wall, costing £298 13s. 4d.

The total expenditure on the Eastern Breakwater to 30th June, 1930, amounted to £152,333 7s. 1d.

The total expenditure on these works, including all charges, amounted during the year to £40,283 15s. 9d.

Northern Breakwater.—800 feet of the top of this breakwater was concreted at a cost of £3,108 7s. 5d., thus completing this section of the work.

Reclamation Wall.—51 tons of stone placed in reclamation wall as repairs to storm damage at a cost of £13 3s. 8d.

Coff's Harbour Jetty.—The expenditure during the year for maintenance and renewal of piles, girders, decking and fenders amounted to £1,491 12s. 7d.

Buoys and moorings at this jetty were overhauled and defective cables replaced.

Sand Drift Prevention.—Repairs to defective brush fences at the northern end of Coff's Harbour were carried out at a cost of £73 6s. 10d. The reclamation of the beach adjacent to the Northern Breakwater was also commenced with a view to prevention of sand drift, 10,056 tons of spoil being deposited.

NAMBUCCA RIVER IMPROVEMENTS.

Permanent repairs and strengthening of the main training wall were completed during the year, costing £3,820 2s. 8d.

Repairs to Stewart Island Block Dam, commenced during the preceding year, were completed at a cost of £817 4s. 9d., of which £72 11s. 7d. was expended during the year under review.

MACLEAY RIVER.

A contract was let during the year for repairs to the Macleay River training wall at a cost of £918, and work was nearing completion at the end of the year.

NEWCASTLE.

Submarine Rock Excavation.—The rock drills "Digger" and "Vulcan" were engaged on this work, weather permitting. Towards the close of the year, the Lobnitz rock breaker "Cyclops," on loan from the Sydney Harbour Trust, was put into operation on the Bar with the object of expediting the removal of rock and reducing costs. Adverse weather conditions prevented a fair trial of this plant before the end of the year.

During the year 2,912 holes of a total length of 21,380 feet were drilled; 6,270 lb. of explosives used and 33,202 tons of stone lifted.

Removal of Tomago Rocks.—During the year an additional 5,543 holes were drilled and blasted.

Hexham Barrage.—The construction of the Hexham barrage in connection with the closing of the South Arm of the Hunter River was commenced, and work was well in hand at the close of the year. 9,270 tons of rock lifted from the Tomago operations were placed during the year.

FLOATING DOCK.

Dredging the Floating Dock Site and approach channel was continued during the year, 1,641,872 tons of silt being lifted, bringing the total tonnage dredged to 30th June, 1930, to 2,637,674 tons.

ANCHORAGES.

Four mass concrete anchorages in connection with the mooring of the floating dock were completed during the year by the Foundation Company, Ltd. under contract at a cost of £13,261 5s. 8d.

DREDGING.

The summary of the year's operation is as follows:—

Description.	Tons.
Harbour improvements and maintenance	1,585,933
Reclamation	858,059
River dredging	16,345
Total tonnage	2,460,337
Cost	£ s. d. 102,502 12 1

(Tonnage lifted includes submarine rock excavation, but excludes dredging floating dock site and approach channel referred to above.)

Lee Wharf Extension.—The Wheat Shed construction was completed during the year, the total cost amounting to £7,610 8s. 7d.

Inflammable Liquids Wharf, Wickham.—Repairs to damage caused by fire on a vessel berthed at this wharf were carried out, the cost being borne by the company concerned.

Minor repairs were carried out to King's Wharf, Hunter River Company's Wharf, Sulphide Wharf and Timber Wharf.

Total expenditure on Harbour maintenance amounted to £8,124 17s. 5d.

SYDNEY HARBOUR.

Repairs were effected to stone retaining walls along the banks of Long Cove Canal, and mangrove swamps were cleared at Drummoyne and Concord.

COOK'S RIVER AND BOTANY BAY.

Repairs were carried out to stone-walling along Cook's River. Earth banks were constructed along Cook's River and Shea's Creek for the purpose of retaining material dredged in each locality.

Operations in connection with the removal of rock were commenced at the entrance of Cook's River with a view to deepening the channel.

PORT HACKING.

Repairs to Audley Dam were commenced and were still in hand at the end of the year.

Extensive borings in Port Hacking were carried out on behalf of the Metropolitan Water, Sewerage and Drainage Board.

The total expenditure in the Metropolitan District on harbours and drainage works was £46,028 7s. 4d. (including unemployed relief works).

WOLLONGONG HARBOUR.

Three wooden mooring posts were replaced by iron hooks set in concrete. Including haulage and shipping of coal and repairs to coal loading plant, the total expenditure amounted to £709 9s. 3d.

PORT KEMBLA.

The year's output from the new quarry at Gillan's Hill amounted to 93,384 tons distributed as follows :—

	Tons.
State metal crushers	49,401
Eastern Breakwater construction	36,104
Northern Breakwater repairs	177
Spring Hill road reconstruction	55
Sea wall construction	7,647
Total	93,384

The total output of the quarry since developmental work ceased up to 30th June, 1930, was 105,569 tons, costing £27,867 6s. 10d. at a unit cost of 63·35d. per ton.

Eastern Breakwater.—Extended 74 feet to chainage 3,048 feet; during the year 33,706 tons of stone placed in construction and 177 tons in repairs. Total stone tipped to 30th June, 1930, 1,028,470 tons costing £286,447 7s. 10d.

Northern Breakwater.—2,887 tons of stone tipped in repairs costing £2,274 18s. 4d.

Haulage and Shipment of Coal.—Appendices "A," "B" and "C" indicate traffic and shipping details of the port during the year.

Jetties.—No. 1 Jetty—Repairs to piles and superstructure were effected and the jetty and superstructure was treated against white ants at a cost of £1,194 12s. 11d. No. 3 Jetty—An amount of £159 1s. 6d. was expended in minor repairs. No. 4 Jetty—General repairs and renewal of certain piles and girders were carried out costing £1,502 8s.

KIAMA BASIN.

The old cargo shed was demolished and new shed completed under contract at a cost of £677 9s. 8d. £136 18s. 4d. was spent on minor repairs and maintenance.

OTHER PORTS.

At far southern ports from Kiama to Eden an amount of £1,214 19s. 5d. was expended in minor repairs and renewals.

WAGONGA RIVER SPUR WALL.

Construction of the extension to the eastern spur wall was continued, 560 feet of wall being completed at a cost of £3,208 0s. 6d. Expenditure for the year under review was £1,231 2s. 6d. This work was closed down owing to lack of funds.

ROADS.

The expenditure from all sources was £266,493. The sum of £21,733 was expended in the repair and maintenance of roads in the Western Division, works carried out for other Departments absorbed £36,723, and Unemployment Relief Works accounted for £114,905. In addition to the foregoing a sum of £93,132 from Federal Aid Road Funds was expended in the construction of roads in the Western Division.

Works carried out for other Departments (£36,723).—These included Woodenbong road (Main Roads Board), £9,642; Freemantle Estate roads (Lands Department), £8,169; Randwick Rifle Range and Bunnerong roads (Lands Department), £15,832.

Relief Works (£114,905).—The principal items making up this expenditure were :—

	£
Road construction and levelling Crown lands within Metropolitan Area ...	84,465
Road construction and levelling within Newcastle District	11,789
Roads in Western Division	11,947

Federal Aid Roads (£93,132).—The work of constructing roads in the Western Division from Commonwealth-cum-State Funds was continued during the year, the following being carried out :—

Clearing	342 miles
Forming	133 "
Ballasting, gravelling and sand surfacing... ..	58 "

together with the necessary causeways, culverts and drainage.

BRIDGES.

Of a total expenditure of £159,168, the sum of £91,193 was absorbed by new works and the balance £67,975, by maintenance of existing structures.

New works included the following :—

	£
Bethanga Bridge	49,732
Grafton Railway and Vehicular Bridge	36,418
Adelaide Camp Bridges (renewal)	4,812
Cato Creek Bridge (renewal)	1,713
Dangar Bridge (renewal)	10,945
Bridges on Federal Aid Roads	4,592

Bethanga Bridge (£49,732).—This work, which has been described in previous years reports, was approaching completion at the close of the year.

Grafton Railway and Vehicular Bridge (£36,418).—This bridge is being erected by the Railway Department, the expenditure shown being the amount charged to this Department for the vehicular portion of the structure.

Adelaide Camp Bridges (£4,812).—Six bridges were constructed over creeks on road Booligal to Ivanhoe under contract to Messrs. R. J. White & Company. The contract sum was £6,489, of which £4,812 was paid during the year.

Cato Creek Bridge (£1,713).—Situated on the road from Brewarrina to Goodooga, this timber beam bridge of eight spans was erected by Contractor L. J. C. Mansfield for £3,033.

Dangar Bridge (£10,945).—This bridge, over Barwon River at Walgett, consists of two 92-foot composite truss spans and seven 30-foot timber beam approach spans, all on timber piles. The work was carried out by Messrs. J. A. Jackson & Sons.

Bridges on Federal Aid Roads (£4,592).—Six minor bridges were erected, viz., Yancowinna and Twenty-five Mile on road Broken Hill to Wilcannia, Bokhara Bywash on road Brewarrina to Culgoa River, Billabong on road Bourke to Barrington, and two Warrambool bridges on Collarenebri-Angledool and Walgett-Goodooga roads.

Bridge works investigated.

Currawarna Bridge over Murrumbidgee River between Wagga and Narrandera.

Bridge over Upper Murray at Bringenbong.

Sutherland-street Bridge over Parramatta River at Auburn.

Bridges (six) in approach to the Gonn Crossing-Stony Crossing Railway.

Brindingabba Creek Bridge on road Bourke to Hungerford.

Bridges (five) over tributaries to Darling River between Bourke and Menindie.

Bridges (four) over creeks in the vicinity of Hillston and Mossgiel.

PUNTS AND FERRIES.

Maintenance of these services involved an expenditure of £9,750 from Departmental Votes and £42,632 from Main Roads Board funds, pending transfer to the Board as from 30th June, 1930.

PUBLIC WATERING PLACES.

Every endeavour has been made to improve the condition of these establishments which have in the past suffered on account of shortage of funds for their upkeep.

A number of cottages were erected, tanks and drains cleaned out, also fencing erected.

Bores were put down at The Junction and at Gunnaramby on the road Balranald to Ivanhoe; Eldee Creek and Campbell's Creek on road Cockburn to Fowler's Gap; Toulby Gate on road Brewarrina via Culgoa River to the Queensland Border; Osaca on road Milparinka to Wanaaring and Beefwood on road Wilcannia to White Cliffs.

A 15,000 cubic yard excavated tank was put down at Belarabon on the road from Mossgiel to Barnato and a 8,000 cubic yard tank at One Eye, road Mount Hope to Willanthry.

Investigations were carried out in connection with excavation of new tanks at Ivanhoe, Eremeran (road Euabalong to Nymagee); Bundabulla and Hospital Creeks (road Brewarrina to Goodooga); also bores at Birrigoolpa (road Milparinka to Wanaaring), and at 40 mile post on road Benanee to Arumpo, and watering appliances for Williwillingbah on road Brewarrina to Goodooga.

RIVER MURRAY WATERS AGREEMENT.

At Hume Reservoir the progress may be considered satisfactory in view of the reduced funds available.

The gap in the spillway has not been raised above the 100,000 acre-feet level pending completion of the Victorian Railway deviations, but the remainder of the wall is being built on such lines as will permit of a temporary storage of 1,250,000 acre-feet, and an ultimate extension to 2,000,000 acre-feet, as indicated by the report of the Committee of Inquiry.

The concrete placed during the year was 45,045 cubic yards, making a total to date of 354,327 cubic yards.

The contracts for Bethanga Bridge and the Spillway Gates are well forward, and completion can be anticipated early in the ensuing financial year.

Work on Lock No. 15 Construction and Lock Site Surveys is still suspended due to lack of funds. The withdrawal of the coffer dam has been completed and the material stacked on the bank.

The expenditure by the Department from River Murray Commission funds was £293,178 13s. 5d. for the year, making a total to date of £2,843,882 16s. 10d.

A detailed report from the New South Wales Constructing Authority for the year ending 30th June, 1930, is given in the Annual Report of the River Murray Commission, and is attached as Appendix "A."

R. VOWELL, M.Inst.C.E., M.I.E.A.,

Chief Engineer, Harbours, Roads and Bridges,

Chief Engineer for New South Wales, River Murray Waters Act.

16th September, 1930.

APPENDIX A.

RIVER MURRAY WATERS ACT.

ANNUAL REPORT FOR YEAR ENDED 30TH JUNE, 1930.

A.—Hume Reservoir.

1. Investigations and Designs.
2. Land Acquisition.
3. Construction.
 - (a) Road of Access.
 - (b) Quarry.
 - (c) Plant.
 - (d) Gravel.
 - (e) Concrete.
 - (f) Outlet Works.
 - (g) Condition of Stored Water.
 - (h) Release of Stored Water.
 - (i) Spillway Gates.
 - (j) Bethanga Bridge.
 - (k) Bethanga Temporary Ferry.
 - (l) Road Deviations.
 - (m) Supply of Electricity to Victoria.
 - (n) Removal of Timber from Resumed Areas.
 - (o) General.

B. Locks and Weirs.

- (i) Surveys and Borings.
- (ii) Lock and Weir No. 10, Wentworth.
- (iii) Lock and Weir No. 15, Euston.

A. HUME RESERVOIR.

1. Investigations and Designs.

Designs were approved by the River Murray Commission for details of the stairway on the north wing wall, and for access and entrance to the inspection gallery.

In order to study conditions at the cone end of the Victorian Bank and the last three spillway gates, a model was made and inspected by the Commission at Hume, work is proceeding on the lines so determined.

2. Land Acquisitions.

The land resumed amounted to 3,132 acres, making a total area of 10,712 acres acquired to date.

3. Construction.

(a) *Road of Access.*—This has been maintained as required, and action taken to hand over to the Hume Shire and Albury Town Councils the sections within their respective boundaries, on account of the diminution of the construction traffic.

(b) *Quarry.*—The output for the year was 1,954 cubic yards. This consists only of large plums for wall keys, and spalls, chiefly for Victoria. The crushed granite formerly used for concrete has been almost entirely superseded by gravel.

(c) *Plant.*—During the year, crane No. 136 was brought from the quarry to the dam for use as a drag line in handling gravel, boilers, flues, tanks, and the Bucyrus were overhauled at Christmas. The gravel screening plant was erected, the steel elevator tower dismantled and removed from the south wing wall, and a Ruston navy from the Quarry was transferred to Grenfell.

(d) *Gravel.*—Winning was stopped from the end of September to the end of October, the crews being employed on the Tabletop-road. It was decided to screen the gravel, and arrangements were made to give effect to this decision. (See also under "Plant.")

The output for the year was 153,661 cubic yards, of which 71,261 cubic yards were supplied to Victoria. The discovery of a good deposit in the bed of the river with little stripping enabled a rate of 900–1,000 cubic yards per 16-hour day to be maintained.

(e) *Concrete.*—The sluice section (290 ft.) is at R.L. 560–574. The gap section of the spillway (480 ft.) has been raised by arrangements from R.L. 550 to R.L. 553, to give a still water storage of 100,000 acre-feet. The south section of the spillway (blocks K.L. and M.) 232 ft., have been raised to R.L. 578–590, and the South Wing Wall has the upstream wing complete to where it merges into the tail tower block (R.L. 636), and one section of the downstream wing up to R.L. 628.

This work (south of the gap) was pushed on to keep ahead of the Victorian earthwork.

The work is being carried on as for a storage of 2,000,000 acre-feet, but a tentative stepped section for a temporary storage of 1,250,000 acre-feet has been assumed (Lip R.L. 606 and crest R.L. 607) and instructions given to keep the concrete clear of this section pending decision.

The quantity placed was 45,045 cubic yards, and the total to date 354,327 cubic yards.

(f) *Outlet Works.*—Temporary arrangements were made for operating the H.E. stony sluices, and the gates are being cleaned and painted with a special anti-corrosive (Wailles-Dove) mixture.

(g) *Condition of Stored Water.*—In mid-summer the water became badly infected with algæ, which caused an unpleasant taste and smell. This was successfully overcome by copper sulphate dosage in the reservoir, some 20 tons being used, and the quality of the water is being periodically tested.

The town and works pumping station was removed from above the Weir to a site about a quarter of a mile below.

(h) *Release of Stored Water.*—By arrangement the discharge of water is regulated under instructions from the Water Conservation and Irrigation Commission.

A regulated supply was maintained from January to the middle of March.

The reservoir topped the wall (R.L. 553) on 26th August, and attained its maximum height of 555 ft. 1 in. on 21st November.

(i) *Spillway Gates.*—In view of the general financial position the question of deferring and cancelling this contract was taken up, but the terms were so unfavourable that it was decided to proceed with the contract, and store the machinery at Hume until required.

All the operating machinery and guide frames, &c., and three gates have been despatched to Hume, and all except the heaviest parts have been stored in empty barrack buildings.

Some 400 tons of parts representing approximately three-fifths of the total value of the contract have been delivered and a progress payment of 80 per cent. made thereon.

Questions of variation of contract, owing to the impossibility of completing the work as intended, are now under discussion.

(j) *Bethanga Bridge.*—All nine spans of steelwork have been completed, and eight spans decked completely and the ninth in part.

Delivery of decking timber has been delayed by the floods in the north.

The approach road along the old quarry tramline is nearly complete, and the connection with the Albury-road, through Heywood's land just above the township, is in hand. Arrangements have now been made by the Victorian Country Roads Board to carry their work right up to the Victorian end of the bridge, thus covering a small gap length between the end of the bridge and their previous finishing point.

(k) *Bethanga Temporary Ferry*.—Owing to the flooding of the Ebdon and Hawksview Bridges, this punt was operated from 19th August to 21st February continuously, making 4,228 trips and transporting 12,700 vehicles and 18,000 heads of stock.

With the approaching completion of the bridge and the low reservoir level (R.L. 534 at 30th June) it seems improbable that it will be required again.

(l) *Road Deviations*.—During October work was done on the Tabletop-road by the Bucyrus crews, and on resumption of their normal work the roadwork was stopped and all plant, &c., brought back to the dam.

This road now has a bitumen surface from Maryvale Station to the depot site near the Tabletop Railway Station, a distance of 2 miles 26 chains.

(m) *Supply of Electricity to Victoria*.—The work of erecting the pole line and installing the necessary plant is in hand.

(n) *Removal of Timber from Resumed Areas*.—Permission has been given to the public to cut timber free of royalty, on condition that tops are cleaned up, lessees stock not interfered with, &c. A few permits have been taken out, but there is very little demand.

(o) *General*.—The average number of men employed was 249 and the health of the community has been good.

B. LOCKS AND WEIRS.

(i) *Surveys and Borings.*

Work is still suspended due to lack of funds.

(ii) *Lock and Weir, No. 10, Wentworth.*

The hand crane, for handling the parts of the weir, was installed. The construction office is now closed and the lockmaster and lockman also act temporarily as plant caretakers. A few sales and transfers of the smaller items have been made but, although the floating plant has now been twice advertised, no offers have been received.

In accordance with the decision of the River Murray Commission no tolls are being collected.

The lock has been operated 83 times for the passage of 52 steamers towing 22 barges, the remainder being for small boats.

The traffic return shows—

1,023 tons of wool.
619 tons of general.
12 tons of construction material.
No wheat or passengers.

(iii) *Lock and Weir, No. 15, Euston.*

The withdrawal of the coffer-dam was completed in September, and later on, when the river fell, some broken pile ends and filling which showed up were dealt with. Suitable channel marks have been maintained.

The boarding-house was totally destroyed by fire on 26th January. Investigation disclosed no apparent cause nor any negligence on the part of the caretaker, and the insurance was paid in full.

Otherwise all plant, buildings, &c., have been maintained in good order.

(Sgd.) R. VOWELL,
M.Inst.C.E.,
Chief Engineer for New South Wales,
River Murray Waters Act.

24th July, 1930.

PORT KEMBLA DISTRICT, 1929-30.

Port Kembla Traffic and Shipping Returns.

STATEMENT A.

Coal and Coke Shipped at Port Kembla (including Hoskins' Jetty).

	Tons.
Cargo coal	425,530
Cargo coke	45,302
Bunker coal	130,937
	601,769

Traffic (Other than for Shipment).

	tons.	cwt.	qr.
Inwards haulage	62,607	1	3
Outwards haulage	81,845	2	2

SUMMARY OF ACCOUNTS ISSUED, 1929-30.

STATEMENT B.

Port Kembla Shipping.

	£	s.	d.	£	s.	d.	£	s.	d.
Shipping	24,848	4	1						
Cargo	7,668	14	4						
Berthing	1,916	15	11						
Mooring ropes	650	17	11						
Launch hire and lighterage	1,082	7	0						
Gangways	204	0	0						
Anchorage	2	0	0						
Haulage and loco. and waggon hire	2,592	4	9						
Electric crane—5 ton	876	10	0						
Electric crane—2 ton	608	7	11						
Water	1,026	7	6						
Way leave	342	5	3						
Waiting time	108	2	11						
'Phone calls	2	14	8						
Miscellaneous	92	19	3						
				42,022	11	6			

Navigation Department—

Harbour dues	13,740	7	9						
Tonnage	5,062	8	7						
				18,802	16	4			

Port Kembla Electricity Undertaking—

Southern line	21,328	12	4						
Western line	30,184	5	1						
Local services	15,534	12	6						
Rents	348	18	1						
Miscellaneous revenue	215	13	2						
Motor vehicles	309	8	2						
				67,921	9	4			

Resumed Properties Department—

Rent of cottages	803	18	0						
Rent of land	1,464	2	10						
Camping areas	42	1	8						
Sanitary fees	33	12	0						
				2,343	14	6			

Port Kembla Harbour Improvements—

Sale of spalls	4,611	13	5						
Outside services	223	1	9						
Sale of land	37	10	0						
				4,872	5	2			

Wollongong Shipping—

Shipping coal	978	14	1						
Coal into bin (79 shipments totalling 36,862 tons)	41	14	6						
				1,020	8	7			

Stock—

Sales to Sundry Departments and Works				836	19	7			
--	--	--	--	-----	----	---	--	--	--

Miscellaneous—

Boat fees	13	1	0						
Telephone calls	1	10	6						
Rent of land	2	10	0						
Overhead charges on stores and wages	43	14	3						
Miscellaneous services	57	6	1						
Exchange on remittances	0	3	0						
Rent of siding Ulladulla	37	10	0						
Sale of Ford car	11	0	0						
Sale of material	16	6	0						
				183	0	10			
Total				£138,003	5	10			

PARTICULARS OF RIVER ENTRANCES OF NEW SOUTH WALES.

1929-30

Name of Port.	Depth on Bar prior to commencement of work. Position variable.	Sailing distance from Sydney.	Total length of River.	Limit of Navigation for Boats drawing 4 feet.	Catchment Area of River.	Area of Tidal Compartment.	Proposed width of River Entrance between Break-water.	Depths during the year 1929-30 at Low Water Spring Tides.						Anticipated Depth on Completion of Scheme.	
								Maximum.		Average.		Minimum.			
								Bar.	Crossing.	Bar.	Crossing.	Bar.	Crossing.		
	ft. in.	Sea mls.	St. mls.	St. mls.	Sq. mls.	Acres.	Sq. mls.	ft.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft.
Tweed	3 0	372	46	24	418	5,000	8	500	8 0	12 6	6 0	7 9	3 0a	4 6b	9
Richmond	7 0	328	149	68	2,683	6,800	10½	1,000	12 6	11 6	10 11	11 3	9 0	10 6	12
Clarence	8 0	294	247	67	8,505	34,000	53	1,400	14 0	12 0	11 3	11 6	8 3	10 0	18
Bellinger	3 9	228	76	15	479	1,640	2½	500	7 4	7 0	5 2	4 9	2 7b	3 3i	9
Nambucca	4 9	219	58	9	552	2,730	4½	500	7 0	5 6	6 6	5 0	3 7c	3 2j	9
Macleay	5 0	208	214	39	4,581	3,550	6	700	9 3	...	8 6	...	6 0	...	12
Hastings	5 0	172½	110	19	1,389	6,400	10	650	10 0	8 0	8 7	6 5	5 6	5 0	10
Camden Haven	4 6	159½	18	13	238	7,240	11½	400	8 9	7 0	5 9	6 1	4 6	6 0	8
Manning	8 0	141	141	29	3,164	6,800	10½	800	7 0	8 6	6 3	8 6	3 6d	8 3	12
Cape Hawke ...	2 3	125	46	17	514	21,930	34½	400	5 8	10 0	4 1	9 3	2 7e	9 0	9
Lake Macquarie	...	50	...	...	291	26,000	40½	...	6 0	5 9	4 4	4 1	4 0f	3 7k	...
Crookhaven (including Shoalhaven River).	11 0	71	205	22	2,801	2,808 6,533	4½ 10½	...	13 6	8 6	13 6	8 6	13 6	8 6	12
Bateman's Bay	4 0	129	70	24	696	3,750	6	...	9 0	...	6 6	...	4 6	...	10
Moruya	6 0	139	93	4	609	1,550	2½	...	15 6	10 0	10 4	7 8	6 3g	3 0l	9
Wagonga	...	158	9	5	52	1,650	2½	340	9 0	8 0	7 3	7 2	4 0	7 0	10

a—Tweed River, Minimum bar, 4 days only.
 b—Bellinger " " " 1 day "
 c—Nambucca " " " 1 " "
 d—Manning " " " 4 days "
 e—Cape Hawke, " " " 1 day "
 f—Lake Macquarie, " " " 7 days "
 g—Moruya River, " " " 1 day "

h—Tweed River, Minimum crossing, 3 days only.
 i—Bellinger River, " " " 1 day "
 j—Nambucca River, " " " 1 " "
 k—Lake Macquarie, " " " 1 " "
 l—Moruya River, " " " 3 days "

STATEMENT E.

DOCK TRANSACTIONS.

Year ending 30th June, 1930.

	Terranora Dock, Tweed River.	Riley's Hill Dock, Richmond River.	Ashby Dock, Clarence River.	Cundle Dock, Manning River.
No. of Government vessels docked	Nil.	5	5	Nil.
Tonnage of Government vessels docked	Nil.	724	320	Nil.
No. of private vessels docked	10	Nil.	6	1
Tonnage of private vessels docked	547	Nil.	411	91
Revenue received during year	£102 4s. 9d.	Nil.	£78 14s. 0d.	£20 9s. 6d.
Expenditure, docking private vessels	£68 7s. 7½	Nil.	£165 2s. 1d.	£53 5s. 2d.
Cost—Dock maintenance and repairs	£211 11s. 5d.	£534 11s. 8d.	£525 3s. 6d.	£357 2s. 7d.

PORT KEMBLA.

TRADE AND SHIPPING RETURNS.

Vessels entering Port Kembla	1928-29		1929-30.	
	Arrivals	Net Regd. Tonnage.	Arrivals	Net Regd. Tonnage.
Overseas	162	546,785	147	474,007
Coastal	183	40,551	178	35,915
Interstate	181	247,403	247	340,898
Totals	526	834,739	572	850,820

PRINCIPAL EXPORTS.

Item	1928-29		1929-30.	
	Tonnage	Value £.	Tonnage	Value £.
Large Coal	185,379	185,379	425,530	425,530
Stunker Coal	172,796	172,796	130,937	130,937
Coke	47,836	47,836	45,302	45,302
Copper	4,583	363,336	8,072	637,688
Limestone	360	12,063	314	10,990
Slag Fer-				
tilizers	51,169	290,000	50,652	263,790
Manufactured				
Metals	8,584	914,435	6,801	725,420
			21,321	122,594(a)
			447	7,105(b)
Totals	470,707	£1,985,845	689,376	£2,369,356

(a) Pig Iron.

(b) C.I.Spun Pipes.

PRINCIPAL IMPORTS.

Item	1928-29		1929-30	
	Tonnage	Value £.	Tonnage	Value £.
Flister				
Copper	6,809	537,590	8,789	659,340 (c)
re	14,702	147,020	13,772	101,694
Concentrates	979	35,226	966	20,286
Atte	862	74,141	582	37,830(d)
Phosphate Rock	38,275	90,025	40,638	92,063
Sulphur	5,014	29,072	7,037	40,597
Pyrites Fer-				
tilizer (by				
rail).	1,244	13,680	1,620	14,400
Bags & Packing				
Material by				
rail	600	24,128	835	30,327
Lead	1,723	41,783	1,599	35,990
Other Metals	599	36,195	1,647	85,375
Iron Ore			182,749	145,903(e)
Totals	70,807	£1,028,860	260,234	£1,263,805.

(c) Cathodes

(d) Scrap Copper

(e) Iron Ore.

FINANCIAL STATEMENT.

Item	1928-29		1929-30.	
	Revenue	Expenditure	Revenue	Expenditure.
	£	£	£	£
Haulage and Shipment	32,718. 5.11	24,913. 1. 7	42,022.11. 6	30,118. 1.11 (A)
Electricity Supply	63,326.11. 7	63,282. 0. 7	67,611.15. 7	87,893. 5. 3 (B)
	£96,044.17. 6	£93,824.13. 8	£109,634. 7. 1	£121,824. 2. 1

(A) Haulage and Shipment: Interest on Capital debt provided for since and including 1928/29.

(B) Electricity Supply: Initial provision for contribution to Capital Assets Renewal made in year 1929/30. Interest on Capital Debt provided for since and including 1928/29.

PORT KEMBLA.

TRADE AND SHIPPING RETURNS.

Vessels entering Port Kembla	1928-29		1929-30.	
	Arrivals	Net Regd. Tonnage.	Arrivals	Net Regd. Tonnage.
Overseas	162	546,785	147	474,007
Coastal	183	40,551	178	35,915
Interstate	181	247,403	247	340,898
Totals	526	834,739	572	850,820

PRINCIPAL EXPORTS.

Item	1928-29		1929-30.	
	Tonnage	Value £.	Tonnage	Value £.
Cargo Coal	185,379	185,379	425,530	425,530
Bunker Coal	172,796	172,796	130,937	130,937
Coke	47,836	47,836	45,302	45,302
Copper	4,583	363,336	8,072	637,688
Bluestone	360	12,063	314	10,990
Slag Fer- tilizers	51,169	290,000	50,652	263,790
Manufactured Metals	8,584	914,435	6,801	725,420
			21,321	122,594(a)
			447	7,105(b)
Totals	470,707	£1,985,845	689,376	£2,369,356

(a) Pig Iron.

(b) C.I.Spun Pipes.

PRINCIPAL IMPORTS.

Item	1928-29		1929-30	
	Tonnage	Value £.	Tonnage	Value £.
Blister Copper	6,809	537,590	8,789	659,340 (c)
Ore	14,702	147,020	13,772	101,694
Concentrates	979	35,226	966	20,286
Catode	862	74,141	582	37,830(d)
Phosphate Rock	38,275	90,025	40,638	92,063
Sulphur	5,014	29,072	7,037	40,597
Fertilizers Fer- tilizer (by rail).	1,244	13,680	1,620	14,400
Bags & Packing Material by rail	600	24,128	835	30,327
Lead	1,723	41,783	1,599	35,990
Other Metals	599	36,195	1,647	85,375
Iron Ore			182,749	145,903(e)
Totals	70,807	£1,028,860	260,234	£1,263,805.

(c) Cathodes

(d) Scrap Copper

(e) Iron Ore.

FINANCIAL STATEMENT.

Item	1928-29		1929-30.	
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(A) Haulage and Shipment: Interest on Capital debt provided for since and including 1928/29.

(B) Electricity Supply: Initial provision for contribution to Capital Assets Renewal made in year 1929/30. Interest on Capital Debt provided for since and including 1928/29.

Electrical Engineering Branch.

Annual Report, 1929-30.

I. INTRODUCTION.

The Branch's work falls into four main groups :—

1. Hydro-electric investigations.
2. Construction, operation and maintenance of the Burrinjuck Hydro-electric System.
3. Construction, operation and maintenance of the Port Kembla Electricity Supply System.
4. Electrical engineering assistance to other Departments and other Branches of this Department.

II. HYDRO-ELECTRIC INVESTIGATIONS.

During the year no new surveys have been carried out; the field work of previous surveys has, however, been worked up for future consideration.

Hume Reservoir.—A conference was held in Melbourne between the State Electricity Commissioners of Victoria and the Department in March, 1930, as a result of which an understanding has been arrived at in regard to a general policy for the development of power from this source.

A meeting of the River Murray Waters Commission was subsequently held in Melbourne at which the Electricity Commissioners and the Department were represented. The joint views on the question of Power Development, involving the completion of the Hume Dam to conserve 2,000,000 acre-feet or, alternatively, that the Electricity Commission should provide separate storages on the Mitta and Kiewa Rivers, were fully discussed.

The matter is in abeyance pending a decision on the main question of the height to which the Hume Dam will be carried.

Stream Gauging.—Daily river heights were recorded throughout the year at forty-six stations, twenty-six of which are in the Northern District and twenty in the Southern District. One hundred and nineteen discharge measurements were made at stations in the Northern District. Maximum flow observations were obtained on the following streams :—

Boonoo Boonoo River
Bookookoorara River
Guy Fawkes River
Jock's Water
Major's Creek

Macdonald River
Oakly River
Styx River
Wollomombi River

while minimum observations were observed on :—

Boonoo Boonoo River
Bielsdown Creek
Clarence River (Newbold)
Macdonald River

Tia River
Wollomombi River
Yarrowitch River

The stations on Wilson's and Cooper's Creeks were abandoned as a preliminary survey showed that there was very little prospect of power development from these streams.

Rating tables have now been prepared for all stations in the Northern District except Commissioners Waters, Gara River and Wollomombi River.

In the Southern District, fifty-nine discharge measurements were made and maximum observations were obtained at the stations on the Mongarlowe and Corang Rivers, two main tributaries of the Shoalhaven and on the Shoalhaven itself at Warri and Welcome Reef.

All computations in connection with discharge measurements obtained in the field during the year have been computed and recorded in the registers while the discharge curves have been plotted and the rating curves brought up to date.

All station equipment and gauging apparatus have been maintained in good working order.

Wyangala Dam.—Designs were finalised in connection with the screening arrangements at the upstream face of the dam and for two outlets of 7 feet diameter each, controlled by sluice gates.

Tenders have been invited for the necessary outlet pipes and gates. Arrangements have also been made for the preparation of the power station site at the downstream toe of the dam.

III. BURRINJUCK HYDRO-ELECTRIC DEVELOPMENT.

No. 1 Power Station Operation.—The turbines have run continuously throughout the year and, with the exception of minor troubles due to an unprecedentedly low head, have performed satisfactorily.

The maximum demand on the system increased from 2,000 kW. to 3,700 kW., and as this exceeded the capacity of one machine under the low-head conditions which existed toward the end of the year, two machines had to be run almost continuously for four months.

The operation of two machines from one supply pipe introduced some problems in regulation, but these were successfully overcome.

Taking the rainfall at Burrinjuck as an indication of that on the whole catchment area, the totals in the last two years have been much below the average. The 1928-29 figures were the lowest for seventeen years and the 1929-30 figures were very little better. The aggregate of the two years was below several single year figures throughout the twenty-one years recorded.

Shunt Reactor.—This was put into service in August, and had the desired effect of neutralising the charging current of the long transmission lines.

Inlet Screens.—The two screens over the inlet chambers at the upstream face of the dam were successfully placed in position under 160 feet of water and one temporary baulk was lowered into place. The placing of the second baulk was delayed on account of a faulty hoisting chain and this is being replaced.

Accommodation.—The septic tank systems for the various staff cottages were completed and put into service during the year.

Access Road.—The portion of the Shire Road between Marilba on the Main Southern Road and Waterview, a distance of 9 miles is under construction as a relief work. A considerable amount of forming, grading and drainage has been carried out and after consolidation and metalling there will be a good access road right to the dam.

No. 2 Power Station.—No field work was carried out in connection with No. 2 Station during the financial year.

Further investigation was, however, carried out based on the experience with No. 1 Station. The comparatively high load factor of over 60 per cent. disclosed in the operation of No. 1 considerably modified figures in connection with No. 2 which had previously been based on a 40 per cent. load factor. It is now realised that with the higher load factor, the available water can be used most efficiently in two units of 7,500 kW each, with provision for a third unit to be added at a later stage should any change take place in the load characteristics.

Transmission Lines.

The operation of the 205 miles of 66 kV. lines which were placed in service between February and July, 1928, has been entirely satisfactory. One 66 kV. transformer failed due to lightning. The single circuit 66 kV. line, 65.5 miles in length, was completed and a supply given to the Federal Capital City on 1st September, 1929. The line consists of 7/104-inch copper conductors, insulated with four Jeffery-Dewitt disk insulators in suspension and five in strain positions, on steel crossarms supported by wooden poles generally 50 feet in length.

The line for supplying Wyangala Dam and Cowra was completed and placed in service on 15th December, 1929. This is of similar construction to the Canberra line, but is equipped with Lapp, instead of Jeffery-Dewitt insulators. The 66 kV. line terminates at a sub-station at Darby's Falls, from which a 6.5-mile line serves Wyangala Dam and a 12.5-mile line Cowra. These lines operate at 11 kV.

A pole type 66 kV. sub-station was completed at Marilba and supplies given to the towns of Binalong and Bowning, the secondary lines being at 6.6 kV. The reticulations in the towns were carried out by the Department and consumers are supplied direct.

Additional business in connection with bulk and retail supplies reached the following stages :—

Bulk Supplies.

Negotiations Opened.—Grenfell Municipal Council, Lake George Mining Corporation (Captain's Flat).

Agreements Executed.—Temora Municipal Council.

Supplies Provided.—Commonwealth Government (Canberra), Cowra, Yass Municipal Council, Water Conservation and Irrigation Commission (Wyangala Dam).

Retail Supplies.

Negotiations Opened.—Darby's Falls-Woodstock, Woodstock-Carcoar.

Agreements Executed.—Cootamundra-Wallendbeen, Cootamundra-Temora, Binalong-Galong.

Guarantees Executed.—Galong, Wallendbeen Townships, Stockinbingal, Darby's Falls Villages.

Supplies Provided.—Marilba-Bowing-Binalong, Wallendbeen Township.

Rural Supplies.

Supply of electricity to rural districts including some smaller townships, has been investigated during the year. Power surveys have been completed for the following districts :—Tarcutta, Tumut-Adelong-Batlow, Darby's Falls-Woodstock-Carcoar, Lachlan Valley below Cowra, Koorawatha-Grenfell, Koorawatha-Morongla, Murrumburrah-Kingsvale, Cootamundra-Temora, Murrumbateman, Bookham, Bethungra, Binalong-Burrowa, Junee-Warre-Warral-Yathella, Stockinbingal.

Street Lighting.

An analysis of the cost of providing street lighting over the Burrinjuck System was made and standard charges in connection therewith were approved for adoption.

Trading.

The trading of the Burrinjuck Electricity Supply during the financial year under review showed a marked improvement over previous periods.

An investigation into the existing methods of handling and keeping retail accounts in connection with the Burrinjuck Electricity Supply was effected and revised methods which should occasion considerable economies will be placed into operation as and from 1st January, 1931.

*** IV. PORT KEMBLA ELECTRICITY SUPPLY.**

Power Station.

The operation of the Power Station plant during the year was satisfactory and no major failures or interruptions to the supply occurred during the period.

The new circulating water system, by which the waters of the harbour are led at sea level to the basement of the engine room, was put into operation and a marked improvement in the efficiency of the plant resulted immediately.

In consequence of the unsatisfactory performance of the sprung arch of No. 4 Boiler, a suspended arch was installed. This effected improvement in the performance of the boiler.

Careful consideration was given to the proposal to instal pulverised fuel equipment on one of the boilers but it was decided, in view of the very high cost of altering the boiler and the comparatively low cost of fuel at Port Kembla, that the installation was not economically justified.

A 5,000 kW. British Thomson-Houston generator was purchased from the Adelaide Electric Supply Company and has been delivered and stored at Port Kembla. The erection of this plant and the purchase of the necessary auxiliary equipment has been deferred owing to the general trade depression.

Portion of the new substation building which was designed to meet the greatly increased load on the system, has been adapted for use as a general store until it is actually required for its proper purpose.

The arrangement of the transformers and the general lay-out of the substation has been re-designed to make the utmost use of the restricted building.

Two 600 kVA. transformers were installed to supply power for the station auxiliary plant to replace the old transformers which were overloaded.

Transmission Lines.

A 33 kV. line connecting the Southern Line at Kiama with the Western Line at Moss Vale, was constructed and placed into service on 6th September, 1929, thus completing a 33 kV. ring main from Port Kembla via Kiama, Moss Vale and Yerrinbool. The line is 30 miles long and consists of 7/104 inch copper conductor, with 6-feet triangular spacing. Steel crossarms and wooden poles have been used throughout.

The line facilitates the maintenance of the lines which have been in service a number of years and improves operating conditions at the Moss Vale end of the ring.

Step-down substations at Jamberoo, Robertson, and Burrawang have made power available at these centres.

Interchange of Power with Australian Iron & Steel Ltd.

The arrangements for the interchange of power with the Steel Company operated during the year with mutual advantage. The Department purchased from the Company 1,625,000 kWhs and sold to the Company 658,000 kWhs.

Additional business in connection with bulk and retail supplies reached the following stages:—

Bulk Supplies.

Negotiations Opened.—Camden and Picton Municipal Councils, Wollondilly Shire Council.

Agreements Executed.—Wingecarribee Shire (Robertson and Burrawang) Council.

Supplies provided.—Wingecarribee Shire (Bundanoon) Council.

Retail Supplies.

Negotiations Opened.—Gerringong-Toolijooa-Omega, Jamberoo Village.

Supply of electricity to rural districts including some smaller townships have been investigated during the year.

Power surveys have been completed for the following districts:—Gerringong, Berry, and South Shoalhaven.

V. WORK FOR OTHER BRANCHES.

Water Supply and Sewerage Branch.

Assistance has been given to the Water Supply and Sewerage Branch by reviewing specifications and making recommendations for all electrical plant used in connection with water supply works.

Arrangements are in hand for the construction of a transmission line and substation for the Tenandra Pumping Station, part of the Junee Water Supply Scheme. This work involved the construction of a substation for stepping-down the voltage from 66,000 to 6,600 volts, three miles of 6,600 volt transmission line and a 250 kVA. substation at the pumping station for stepping-down the voltage to 415 volts.

Plans and specifications are in hand for the construction of a transmission line and substation for the pumping stations in connection with the South-West Tablelands Water Supply Scheme. This work involves the construction of a substation at Jugiong for stepping-down the voltage from 66,000 volts to 11,000 volts and the construction of 11,000 volt transmission lines therefrom totalling 8.5 miles length to two 250 kVA substations for stepping-down the voltage from 11,000 volts to 415 volts. The substations are located at No. 1 and No. 2 Pumping Stations, which are 6 miles apart.

Remote control, water level indicator and communication circuits are to be arranged between the two pumping stations and the Cowang Gap Reservoir. The pumps at No. 2 Station are to be capable of being controlled from No. 1 Station.

Assistance has been given in connection with the electrical plant used on the Murray River Works during construction.

Harbours and Drainage Branch.

Byron Bay Jetty.—Assistance was given with the official acceptance tests of the electrically operated cranes and the operation of the electrical installation generally.

Cook's River Dredging.—The 11,000 volt substation and low voltage distribution line at Wolli Park, Canterbury, were constructed and the electrically operated Dredge "Zeno" was put into commission. Energy is purchased from the City Council, stepped-down to 415 volts at the substation and led to the dredge by cables on the pontoons carrying the discharge pipes.

Shark Menace Committee—Technical assistance was given to the Shark Menace Committee which had under review a proposed electrical method of preventing the access of sharks to bathing areas.

VI. WORK FOR OTHER DEPARTMENTS.

Local Government Department.

Assistance has been given to the Local Government Department in the review of electricity supply loan proposals, and when necessary an officer of the Branch has attended the inquiries to assist the Commissioners. Inquiries into proposals to borrow for electricity supply were attended at Dundas, Eastwood and Tenterfield.

The technical provisions of all proposed electricity supply franchise agreements submitted to the Local Government Department have been reviewed for that Department.

Department of Mines.

Officers of this Branch have acted as examiners at the Mine Electricians and Electric Motor Drivers' Examinations.

Government Tourist Bureau.

Kosciusko—Telephone Communication.—The telephone installation providing for communication between the Hotel, the new Chalet at Charlotte's Pass and various huts en route to the Seeman Memorial Chalet (within a mile of the Summit) was completed. This work was commenced in the year previous to the one under review but had to be abandoned owing to early falls of snow.

The installation has operated satisfactorily and has been found to be of great convenience. Arrangements have been made with the Postal Department for the new Chalet to be connected to the trunk line at the Hotel.

Bulk Storage of Oil.—An installation of three 2,000-gallon underground tanks for the bulk storage of oil for the 80 kW. oil engine plant was completed.

Yarrangobilly Caves Hydro-Electric Development.—During the winter months advantage was taken of the absence of visitors to the Guest House at Yarrangobilly Caves to have a complete overhaul of the Pelton Wheel set. New bearings were fitted and provision made so that in the event of a failure of the main generator an auxiliary generator might be belt-driven off an extension of the main shaft.

Child Welfare Department.

An 11,000 volt transmission line and substation have been constructed in connection with the Gosford Farm Homes. The Erina Shire Council purchases in bulk from the Railway Commissioners and supplies the Farm Homes. A low voltage distribution line from the step-down substation to the new pumping plant was also constructed.

Education Department.

Assistance has been given with matters in connection with the electrical installation at the Education Department's Furniture Workshops, Drummoyne.

Health Department.

An agreement was made with the Railway Commissioners for a supply of electricity to Morisset Mental Hospital. A contract was let for the construction of an 11,000 volt transmission line from the Railway Commissioners' substation at Morisset Railway Station to the Hospital and the construction of a substation in a central position.

A substation and control and water level indicator circuits were also arranged for in connection with the water supply system of the Institution.

28th November, 1930.

V. J. F. BRAIN,
Chief Electrical Engineer.

Sydney Harbour Bridge Branch.

Report for the year ended 30th June, 1930.

I have the honour to submit the following report on the work of this Branch for the year ended 30th June, 1930:—

I.—CONSTRUCTION OF THE NORTHERN APPROACH BY THE SYDNEY HARBOUR BRIDGE BRANCH.

On account of the curtailment of loan expenditure, very little work was carried out upon the northern approach.

(a) *Excavation.*

A total of 3,770 cubic yards was excavated, the main item being the south abutment of the 220-feet steel arch bridge.

(b) *Concrete Work.*

The concrete poured amounted to 11,930 cubic yards, the chief items being the piers and flat top construction for the viaduct fronting Junction-street, between Arthur-street and Alfred-street.

(c) *General.*

The widening of Broughton-street was carried out, an area of 1,414 square yards being penetrated and seal coated.

Rendering of the concrete arches and retaining walls was continued throughout the year.

Incidental works such as waterproofing, fencing, kerbing and guttering, and the laying of drains were also continued throughout the year.

II.—CONTRACT OF DORMAN, LONG AND COMPANY, LTD.

(a) *Concrete and Masonry.*

The year ended 30th June, 1930, has differed considerably from the previous twelve months in the class of construction which has been carried out.

Previously all substructure efforts had been concentrated on the erection of piers for the approach spans and on the construction of the abutment towers to a height sufficient for that purpose also. During the twelve months just completed, however, the erection of the main arch has been the dominant factor of construction, and substructure work has been intermittent and only carried out at such times as did not interfere either with the drawing of the anchorage cables and their attachment to the arch or with the erection of the arch itself.

At Dawes' Point, the masonry facing on the front of the abutment tower has been completed from R.L. 92.5 to final levels. This had been held up for some months whilst the raking struts from panel points 29 on the arch to the pylon were in position.

Similarly, the masonry facing on the back wall was held up whilst the anchorage cables were being drawn but has now been completed except for a small section which cannot be started until after the cables are removed.

The side walls which were nearing completion at the commencement of the twelve months under review were finished to the main slab level (R.L. 155.50) at the end of 1929, and further construction was held up until all the anchorage cables were attached to the arch, as the cranes were required for this work and could not be released to erect the timber towers on the steel deck and for their transference to these towers for further construction of the pylon.

When the cranes did become available, these towers were started, but further delay was caused as the final approved plans were not completed.

In May, 1930, a start was made with the construction of the pylons, *i.e.*, above R.L. 155.50, and this work is now progressing well. The work is of cellular construction consisting of masonry walls concrete backed with reinforced concrete slabs tying them together and includes the heavy ornamental masonry balconies corbelled out from the side walls and the masonry arches through which a footway and one railway track pass. The method of construction adopted is to set the masonry before placing the concrete backing so that the erection vertically will not be as rapid as it was below R.L. 155.50 where the concrete shell walls were constructed first and the masonry shell built afterwards.

On the eastern side, construction is now to the level of the top of the balcony and on the western side it is not quite as far advanced. The anchorage cables do not permit of any construction on one internal corner of each tower for the present, and these sections are being left until the cables are removed in a few months.

At Milson's Point, the construction of the pylon is not as far advanced as at Dawes' Point for the reason that the cranes were required till a later date for work incidental to the arch erection, and at the end of June, 1930, R.L. 155.50 was the limit of construction. The masonry facing has been built to this level with the exception of a small section in the front which until recently was in use for the base of the raking struts to the arch.

The timber towers for final construction of the pylon have been erected, and one of the two cranes is in position on top of them. These cranes, which are of the Scotch derrick type, have been, both at Dawes' Point and Milson's Point, converted from steam to electric drive on account of the difficulty of supplying water and fuel to the high levels.

The following are the quantities for the masonry and concrete work during the year :—

No. 1 concrete	...	...	...	...	...	...	...	...	3,107 cubic yards.
Granite masonry	...	...	...	...	...	...	...	...	2,216 "
Four-cut work on granite masonry	...	...	...	...	...	...	...	...	13,819 square feet.

(b) Fabrication of Steelwork.

During the year, 5,074 tons of carbon steel were delivered at Milson's Point, of which 3,521 tons were rolled in England and the balance of 1,553 tons rolled at Newcastle by the Broken Hill Proprietary Co., Ltd. The total silicon steel delivery during the year amounted to 11,409 tons, all rolled in England.

The total steel and bronze delivered to date is 48,900 tons, which is almost the whole of the material required.

There were 4,025 gallons of shop paint and 3,124 gallons of field paint delivered, the totals to date now being, shop paint, 11,760 gallons; and field paint, 3,124 gallons.

The rivet deliveries now total 2,425 tons, of which 633 tons were delivered during the year.

During the twelve months, 17,966 tons of steelwork were fabricated—an average of approximately 1,500 tons per month—comprising practically the whole of the northern half-arch and nine panels of the southern half. In addition, the anchorage link plates for the northern side were completed and a number of stages for erection and field riveting purposes fabricated.

The first hanger webs were assembled on June 10th, 1930, and riveting of these commenced on June 16th.

The graph herewith shows the quantities of material delivered, fabricated, erected in place and completely riveted since the first steel delivery.

(c) Erection of Steelwork.

At the commencement of July, 1929, erection was proceeding on the third panel on the southern side, whilst preparations were being made for the commencement of the erection of the main span on the northern side when the material for the first length of bottom chord 28-28X was ready for erection.

A start was made with the erection of the main span on the north side on 22nd July, 1929, and by the 30th June, 1930, eleven panels had been erected.

On the south side the erection was carried forward from the third panel to the first triangle of the twelfth panel by the end of June, 1930. A halt was made on the erection when the first triangle of the eighth panel had been erected on 21st January, 1930, and a resumption was not made until 72 days later, when the erection of the southern cantilever was continued.

During the suspension of construction for 72 days at the eighth panel on the south side, the fourth, fifth, sixth, seventh and eighth panels were erected on the north side, thus balancing the progress made up to date on both sides.

The attached diagram shows the progress of construction at each three-monthly period from 30th September, 1926.

(d) Painting.

South Side.—A start was made with the painting of the first field coat on span No. 1 on 14th August, 1929, and the approach spans were completed up to the first three panels on the fifth approach span on 13th March, 1930, when the painting of the southern half-arch at panel point "27" of the first panel was commenced.

By the end of the year, painting was proceeding on the third panel of the arch.

The painting of the outside surfaces of the top and bottom chords has been omitted until such time as the painting cranes are in operation. The inside surfaces of these chords, however, for the first three panels are being painted.

The top and bottom lateral diagonals, truss verticals and diagonals in these panels have received their first field coat.

No painting was done on the main arch during June, 1930, as the painters had been taken back to complete the last three panels of span No. 5, the painting of which at the end of the month was almost completed.

North Side.—A start was made with the painting of the first field coat on the northern approach spans at span No. 6 on 23rd September, 1929, and by 30th June, 1930, the application of the first field coat was completed up to the fifth panel of span No. 10.

The painting of the northern half-arch was commenced during April, 1930, and at the end of June painting was proceeding in the third panel.

The top and bottom lateral diagonals, truss verticals and diagonals in these panels have received their first field coat. The outer surfaces of top and bottom chords have been omitted pending the bringing into use of the painting cranes. The interior surfaces of the top and bottom chords, however, of the first three panels are being painted.

3. CONSTRUCTION OF THE SOUTHERN APPROACH BY THE SYDNEY HARBOUR BRIDGE BRANCH.

As on the northern approach, the work was seriously curtailed on account of reduced loan expenditure.

(a) *Excavation.*

A total of 15,512 cubic yards was excavated, being chiefly the abutments for Argyle-street arch and the excavation for the railway track tunnels between Grosvenor-street and Argyle-street.

(b) *Concrete Work.*

The walls, roof, drains and floor, and waterproofing protection constituted the main items of the concrete work. The 57-foot arch and the western half of the 64-foot arch were also poured during this financial year.

The total quantity of concrete poured was 21,442 cubic yards.

(c) *Waterproofing.*

A total area of 9,168 square yards was waterproofed, 7,407 being by fabric waterproofing, the remainder by mastic waterproofing.

(d) *General.*

A total area of 5,710 square yards of protective brickwork was laid for the waterproofing. In addition to the various incidental works, a temporary bridge was erected over the Argyle-street arch abutments and a cable tunnel constructed through the site for the new Scots' Church.

4. FINANCIAL REVIEW.

(a) *Land Tax.*

To defray one-third of the capital cost of the construction and land resumptions and provide for the maintenance and lighting of the roadways and footways of the Sydney Harbour Bridge and approaches from Waverton Station on the northern side of the Harbour to Wynyard Station on the southern side, a land tax of one half-penny in the pound was imposed upon the unimproved capital value of all ratable land within the city of Sydney, the municipalities of North Sydney, Mosman, Manly, Lane Cove, Kuring-gai and Willoughby, the shire of Warringah and portion of the shire of Hornsby.

The tax was first imposed in 1923, the rates for the years 1923-30 are as shown on table appended. Of the amount of £1,286,948 15s. 11d. due to 30th June, 1930, a total of £1,103,368 13s. 8d. was paid to the special deposit fund, leaving a balance of £183,580 2s. 3d. to be paid before 31st December, 1930. Interest upon the amounts received from the rate levy is calculated on the daily balance.

The table shows the details of rates due since the tax was first imposed, the payments to 30th June, 1930, and the balance outstanding at that date.

(b) *Expenditure.*

The total expenditure to 30th June, 1930, is shown in the following table. The cost to date of the bridge and approaches, including land resumptions and all other charges, is £6,463,943 8s. 7d., of which interest on expenditure is £683,315 1s. 10d. and resumptions, £1,212,360 10s. 11d., but a large proportion of the latter amount, if not the full amount, will be recouped by the disposal of the residues upon the completion of the bridge.

It will be seen that the wages variation to date on the contract of Dorman, Long & Co., Ltd, is slightly less than 12 per cent. of the amount paid for construction. This percentage is higher than previously on account of the greater margin above ordinary award wages due to the men being engaged upon the main span.

Rate Levy—Payments and Outstanding Amounts at 30th June, 1930.

	1923.	1924.	1925.	1926.	1927.	1928.	1929.	1930.	Total.	Payments to 30th June, 1930.	Balance Outstanding to 30th June, 1930.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
City Council	74,035 19 0	91,666 4 1	92,149 5 0	92,512 6 1	124,928 15 1	126,967 1 4	125,980 6 11	126,478 10 1*	854,718 7 7	723,270 9 5	131,447 18 2
Hornsby Shire Council	3,072 18 6	3,203 11 0	3,326 17 9	3,348 5 6	3,879 2 1	3,826 11 8	3,759 15 2	4,665 14 0	29,082 15 8	26,234 16 9	2,847 18 11
Kuring-gai Municipal Council....	6,259 11 2	6,625 0 7	7,703 0 5	7,739 4 8	7,917 16 7	12,075 10 2	12,406 7 10	12,395 18 11	73,122 10 4	63,726 11 5	9,395 18 11
Lane Cove Municipal Council ..	2,400 6 10	2,440 14 1	2,440 0 6	3,012 1 11	3,027 18 10	3,014 15 11	3,740 18 11	3,794 18 10	23,871 15 10	21,350 1 7	2,521 14 3
Manly Municipal Council	5,051 12 1	6,362 16 8	6,437 19 6	6,494 8 4	7,611 12 11	7,580 19 3	7,543 9 11	7,654 18 10	54,737 17 6	46,487 1 0	8,250 16 6
Mosman Municipal Council ...	5,357 7 6	5,854 17 3	5,850 3 4	5,900 4 0	6,737 13 11	6,709 11 4	6,230 18 6	8,445 2 2	51,085 18 0	45,485 7 11	5,600 10 1
North Sydney Municipal Council	9,646 10 2	9,699 12 4	10,943 12 1	10,838 14 3	10,700 8 5	12,599 7 1	12,377 14 5	12,556 13 4	89,362 12 1	79,566 14 6	9,795 17 7
Warringah Shire Council	3,919 10 7	4,661 2 7	5,707 7 2	7,032 19 1	7,103 4 8	7,812 6 9	8,554 4 1	8,811 0 2	53,601 15 1	44,412 4 0	9,189 11 1
Willoughby Municipal Council	5,024 10 2	5,294 11 4	5,389 14 5	7,831 11 10	7,824 7 7	7,782 7 10	9,049 10 1	9,168 10 7	57,365 3 10	52,835 7 1	4,529 16 9
Totals	£ 114,768 6 0	135,808 9 11	139,948 0 2	144,709 15 8	179,731 0 1	188,368 11 4	189,643 5 10	193,971 6 11	1,286,948 15 11	1,103,368 13 8	183,580 2 3

* Subject to supplementary assessment.

SYDNEY HARBOUR BRIDGE.

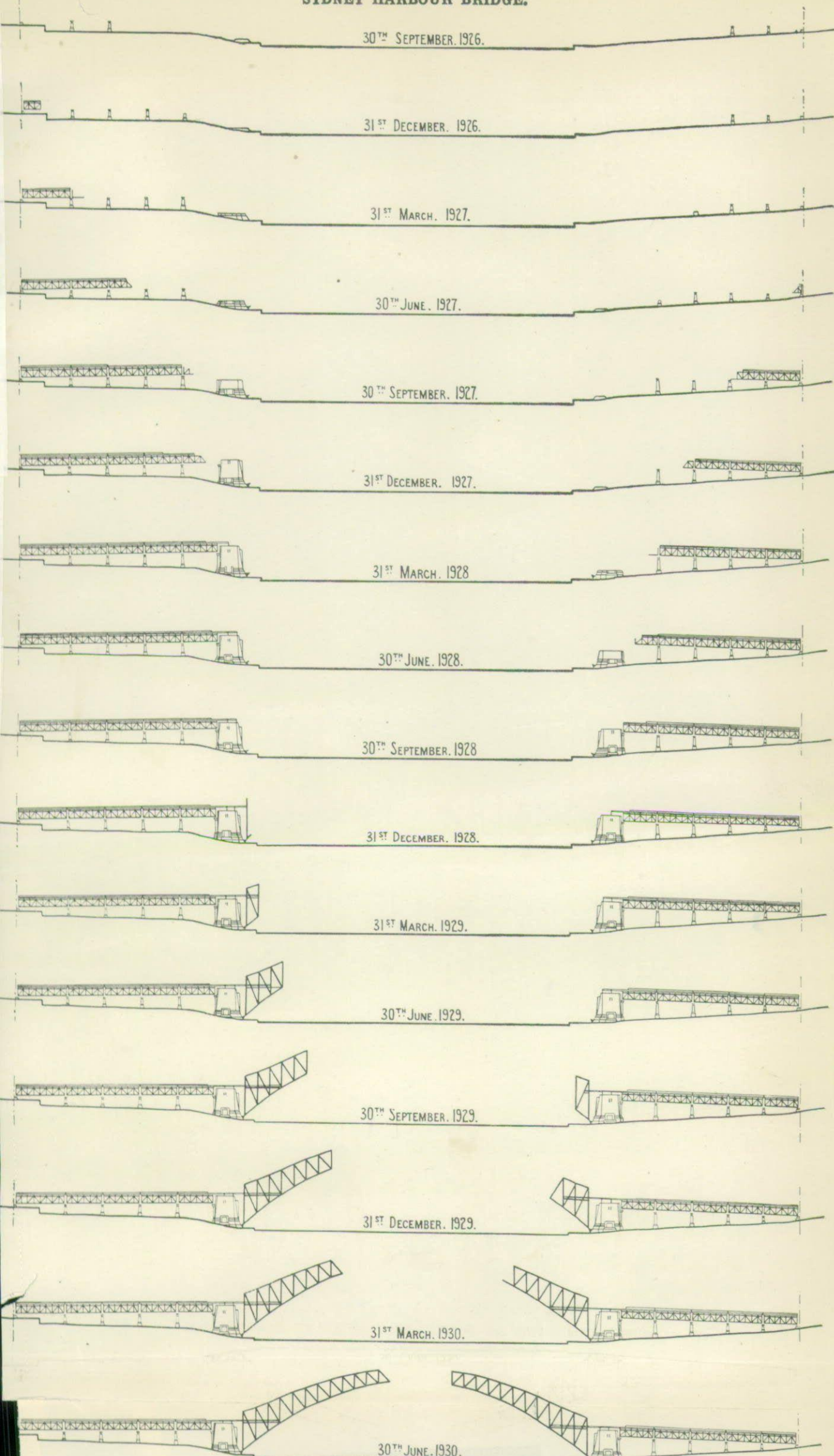
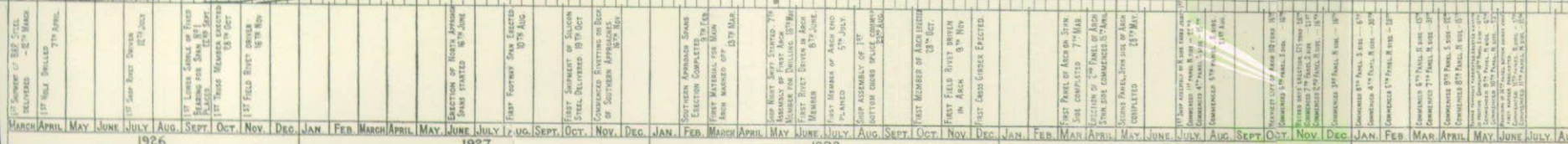


Diagram showing the progress of construction at each three monthly period.



*49261—

Sydney Harbour Bridge Expenditure to 30th June, 1933.

Work.	To 30th June, 1923.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.	1928-29.	1929-30.	Totals.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Bridge—Salaries, &c....	17,058 7 4*	1,581 5 9	15,821 18 8	12,703 0 0	16,120 17 10	22,093 10 4	31,970 14 1	29,548 0 8	146,906 14 8
Dorman, Long & Company's Contract .....	.....	.....	6,769 4 2	100,029 14 6	450,265 2 1	674,409 5 11	603,760 0 3	1,000,969 16 8	2,836,203 3 7
Dorman, Long & Company— Wages Variations .....	.....	.....	.....	10,101 13 5	28,827 8 8	64,493 11 2	84,633 14 6	141,638 3 5	339,694 11 2
Dorman, Long & Company— Excess Overhead .....	.....	.....	.....	.....	.....	.....	12,035 14 11	7,663 18 11	19,699 13 10
Dorman, Long & Company— Painting Cranes .....	.....	.....	.....	.....	.....	.....	.....	1,312 10 0	1,312 10 0
Approaches .....	.....	91,651 13 6	103,563 3 2	89,133 18 6	86,261 7 1	263,391 13 7	335,836 19 9	169,486 6 6	1,139,265 2 1
Impressions .....	.....	40,195 0 0	73,753 8 7	245,382 3 5	278,799 7 2	432,175 11 7	123,898 15 2	12,156 5 0	1,212,360 10 11
Under Bay Station .....	.....	43,730 18 0	58,704 9 2	3,274 5 6	4,535 19 4	Cr. 28,469 4 3†	559 7 6	2,700 5 3	85,036 0 6
Interest on Expenditure .....	.....	.....	.....	22,619 19 2	35,266 13 1	68,572 19 11	273,519 3 4	283,236 6 3	683,315 1 10
at Moruya .....	.....	.....	.....	.....	150 0 0	.....	.....	.....	150 0 0
Totals	£ 17,058 7 4	183,158 17 3	258,552 3 9	483,394 14 7	910,076 15 3	1,496,667 8 3	1,466,223 9 6	1,648,811 12 8	6,463,943 8 7

* This amount includes all costs involved from the inception of the work in 1900 to 30th June, 1923.

† A credit of £31,395 0s. 10d. was received from the Railway Department in June, 1928, in adjustment of amounts over-debited during previous years.

5. STAFF.

The number of men employed on the Sydney Harbour Bridge and Approaches at 30th June, 1930, was 1,654, employed as under:—

Approaches, Public Works Department ...	390
Civil Engineering, Dorman, Long & Co., including those at Moruya ...	219
Workshops at Milson's Point (three shifts) ...	761
Erection of steelwork (including Painters) ...	284
Total ...	1,654

J. J. C. BRADFIELD,
Chief Engineer, Sydney Harbour Bridge.

7th November, 1930.

Government Architect's Branch.

Report for year 1929-30.

The certified expenditure is set forth hereunder and for the purposes of comparison that of the two preceding years is also scheduled.

Vote or Account.	1927-28.		1928-29.		1929-30.	
	£	s. d.	£	s. d.	£	s. d.
Loans	82,811	1 3	264,402	15 8	199,951	17 6
Consolidated Revenue	62,236	2 5	98,837	18 11	86,153	19 10
Public Works Fund	91,979	8 6	.....	.....	.....	.....
Special Deposits	27,321	18 4	21,415	9 7	10,700	10 4
Other Departments	215,463	6 11	215,423	16 11	180,657	4 5
Special Purposes (Revenue) Fund .....	.....	.....	.....	.....	15,090	18 7
	479,811	17 5	594,080	1 1	492,554	10 8

In addition to the foregoing, work totalling £173,050 2s. 1d. has been supervised for the Department of Education.

AMALGAMATION.

Towards the close of the year under review, the Architects' Branches of the Departments of Education and of Public Works were amalgamated, and since that date the whole of such work has been carried out by this Department.

The change-over involved an enormous increase in the operations of this Branch, and it is gratifying to report that everything has worked smoothly and Officers of the Education Department have expressed satisfaction as to the result.

Immediately after the taking over of the Schools' work there was an unprecedented rush, as, in addition to normal requirements, the Minister for Education asked that all plans and specifications already prepared and held awaiting tenders might be the subject of review. The number of cases so revised was 57 in all, of which 16 were for important works. It is pleasing to record that in quite a number of cases, following on the recommendations of this Branch, the plans were entirely redrawn to effect economy in planning and construction and improvement in design.

DRAWING OFFICE.

The year has been marked as one of considerable activity, particularly so far as Hospitals work is concerned.

Hospitals.—Various schemes have been evolved upon the most up-to-date lines of hospital design and construction, including works in connection with small improvements and small extensions to existing hospitals, and the erection of a number of entirely new hospitals. The more important cases for which full working plans and specifications have been prepared are :—

- (1) The amended scheme for *The Outpatients' Department at the Newcastle District Hospital*.—This new building will have a basement and three floors erected at the corner of Pacific and King streets. It will be a brick structure with reinforced concrete floors and flat roof, and the whole scheme represents a combined undertaking to be carried out by arrangement between the Federal and State Governments conjointly with the Newcastle Hospital at an estimated cost of £40,000.
- (2) *A complete new Hospital for Queanbeyan*.—In this scheme the accommodation provided is for sixteen public ward patients and nine private ward patients, and includes a modern Operating Theatre, X-Ray, and Casualty Departments, the whole estimated to cost approximately £22,000.
- (3) *New District Hospital at Griffith*.—This scheme, of the Pavilion type, comprises an Administration and Paying Unit forming a Central Block, with Children's and intermediate units on the western side and the Operating and Casualty Units on the eastern side, whilst the Main Male and Female Ward Blocks occupy the extreme wings.
The kitchen and services are situated immediately behind the Central Block.
The buildings are estimated to cost £28,500 and will provide accommodation for fifty patients.
- (4) *New Hospital at Lake Cargelligo*.—These buildings will consist of an Administration and Ward Block, an Operating and X-Ray Department and a Kitchen Block with domestic quarters adjoining on the one side and quarters for Matron and Nurses on the other. In this case accommodation is provided for twenty-two patients at an estimated cost of £16,500.
- (5) *Manly Peace Memorial Hospital*.—Plans and specifications were prepared and a contract let for the erection of a building containing Nurses' quarters, laundry, boiler house and Male Attendants' quarters. The contract price amounted to £15,000, and includes a separate morgue building.

Other Hospitals Works deserving mention include a new Outpatients' Department for Balmain District Hospital, estimated to cost £6,700; a new Isolation Block for Cessnock Hospital, estimated at £4,500; extension to Ward Block and new quarters for the Senior Medical Officer at Lidcombe State Hospital, estimated at £4,800; a new building for cases of Infectious Diseases at the latter institution, estimated to cost £8,900; and a new Male Ward, Maternity Block, and additions to Nurses' quarters at Coff's Harbour Hospital, the cost of which was estimated at £4,000.

Plans and Specifications were also prepared for additions, &c., to Blue Mountains Anzac Memorial Hospital, the Corowa District Hospital, and the Crown-street Women's Hospital, costing approximately £4,500.

A considerable number of hospital proposals were considered and sketch plans and estimates prepared. Amongst the more important are—Extensive additions to the Crown-street Women's Hospital, estimated to cost £84,300; nurses quarters at the Coast Hospital, to cost £61,000; Wollongong District Hospital remodelling and new units which, in conjunction with the existing buildings, form a complete hospital scheme, the estimated cost being £38,250.

For Berrima District Hospital, Bowral, a scheme was prepared embodying the conversion of present hospital into nurses' quarters and proposed new buildings for a complete hospital scheme at an estimated cost of £39,000.

For the Western Suburbs Hospital, Sydney, sketches and estimates for additions and remodelling to form a complete hospital scheme were prepared at an estimated cost of £32,200.

Sketch plans were prepared also for the new Erina Shire Memorial Hospital to cost £28,000, and for the new Tweed District Hospital, Murwillumbah, estimated at £20,000, also for the new District Hospital at Urana, estimated to cost £18,300.

At Yass District Hospital, a scheme of remodelling to provide accommodation for sixteen new patients and also to provide a new X-Ray and casualty department was made out, and this is estimated to cost £7,480.

Sketch plans were prepared for a new children's block and additions at the St. George District Hospital, to cost £19,400; also additions to the Tamworth District Hospital, to cost £10,700; additions to the Carcoar Hospital, to cost £7,500; whilst the proposed new building for medical officers' quarters at the Coast Hospital is estimated at £6,300.

A scheme for an additional storey to the United Dental Hospital was prepared, at an estimated cost of £11,300.

Mental Hospitals.—The principal field of activity in this regard was the institution at Orange. Drawings and specifications were prepared for the administration building, wards for epileptics, wards for quiet and industrious patients, a recreation block and some minor works. These buildings, which represent an estimated expenditure of £79,400, are being constructed of brickwork with tiled roofs and have been designed to harmonise with the previous structures erected. It is pointed out that the plans, &c., for the recreation hall had been drawn during the previous financial year, but, owing to the need for economy, amended plans were prepared for a less costly scheme.

Plans and specifications were prepared for a pathologist's residence at Parramatta Mental Hospital, estimated to cost £2,300.

In regard to the preparation of sketch plans and estimates, among the most important was the consideration of a scheme for the Morisset Institution for Children Mental Defectives to eventually accommodate 1,000 patients. Sketch plans of the various units were completed and a layout plan was prepared and the complete scheme developed to suit the contours of the site and planned to give the most suitable aspect for the various buildings concerned. These include an administration building, hospital block, recreation hall, kitchen and staff dining room and quarters, laundry building, nurses' quarters, school, ward blocks including day and dining rooms, residences for medical staff, matron, clerical staff, a gatekeeper's quarters and a morgue. This scheme, complete with all services, sewerage, &c., is estimated to cost £360,000.

Schools.—In addition to the reviewing work referred to earlier in this report, working drawings and specifications have been prepared for:—

- Manly—New Domestic Science School.
- North Sydney (Crow's Nest) Public School—New Infants' Department.
- Parkes—New Intermediate High School.
- Wingham—New School buildings.
- Condobolin—New School buildings.
- Uralla—New School buildings.
- Ballina—New Intermediate High School.
- Wagga Wagga High School—Additions.
- West Kempsey Public School—Additions.

The estimated cost of the new works amounts to £71,700.

Sketch plans for the following were prepared:—

- Newcastle Boys' High School—Estimated cost £38,500.
- Newcastle Domestic Science School—£28,000.
- Western Suburbs Technical High School—£39,000.
- Armidale Teachers' College Men's Hostel—£31,200.
- Hamilton South New School Buildings—£21,600.
- Temora Intermediate High School—£8,450.
- Harcourt Public School, Additions—£8,000.
- Carlingford New School—£8,000.

Justice Department.

Working drawings and specifications for contracts totalling £14,900 were prepared, the more important being the new Court House building at Quirindi, and the Court House and Police Station building at Coff's Harbour.

Chief Secretary's Department.

Plans and specifications were completed for new police stations at Rappville, Jindabyne, Huskisson, Port Kembla, Caragabal, Croydon and Bondi; new lockup and lockup-keeper's quarters at Griffith, and a new residence at the Mudgee Police Station at a total estimated cost of £31,770.

For additions and alterations to various police buildings, plans, &c., were prepared for works costing approximately £10,000.

Miscellaneous Works.

The most important miscellaneous undertakings for which plans and specifications were prepared during the year were:—

Mount Kosciusko—Chalet at Spencer's Creek.
 Young Soldiers' Settlements—Additions.
 Sydney University—New animal house.
 Parliamentary Buildings—Additions to library.
 Newcastle new City Morgue.

The collective estimated cost of these works is £23,000.

Other projects for which sketch plans were prepared include—

Proposed New Law Courts, Sydney, estimated cost, £560,000.
 Parliament House, Sydney—New Council Chambers and Office Accommodation—£85,590.
 Registrar General's Department—Completion of Northern Wing—£74,700.
 Young Soldiers' Settlements—Proposed pruning sheds, £32,800.
 Proposed alterations to Tourist Bureau, Challis House, Martin Place—£8,300.

Statistical Summary.

Plans prepared —Originals	...	...	...	...	...	...	...	...	812
„ Copies	...	...	...	...	...	...	...	...	4,412
Total	...	...	...	...	...	...	...	...	5,224
Specifications prepared—Drafts	...	...	...	...	...	...	...	...	322
„ Copies	...	...	...	...	...	...	...	...	1,698
Total	...	...	...	...	...	...	...	...	2,020

The estimated cost of buildings represented by working drawings, &c., prepared amounted to £288,470, and that for sketch proposals £1,687,870.

*SUPERVISORY WORK.**No. 1 (Metropolitan) Division.*

Eighty-two contracts have been in progress during the year, the total estimated expenditure being £133,000.

The principal building operations in hand were as follows:—

- (1) Manly Peace Memorial Hospital—Nurses' Home and Morgue. Contract amount, £15,590.

The new nurses' home and morgue comprise the second section of the hospital. The nurses' home provides for a boiler house and laundry on the ground floor and twenty-three living rooms and adjuncts on the two upper floors. Inter-communication covered ways link up the first and second sections. The completion of the second section will permit of the Hospital functioning.

- (2) Royal North Shore Hospital—New Home for Nurses. Contract price £32,392.

The new building nearing completion comprises five floors and is planned to accommodate the whole nursing and domestic staff of this large institution. Bedrooms to the number of 191, together with sitting rooms, matron's suite, general and domestic staff dining rooms and other requirements, are provided. Two automatic electric lifts travel from ground floor throughout upper floors. Fireproof construction has been adopted in the new home.

- (3) Sydney Hospital—New Casualty and Operating Block. Contract amount £67,619.

This building, recently handed over to the hospital authorities and now in occupation, comprises six floors and is of fireproof construction. The building provides for general casualty work on the ground floor, operating theatres on the sixth floor, and surgical wards on the intervening floors. The basement is in use for workshop requirements of the institution. The operating theatres are modern in arrangement and equipment. All floors are served by an electric lift.

- (4) Women's Hospital, Crown-street—New Infectious Block and Laundry—Contract amount £33,943.

This infectious block is the last word in hospital design and has six floors. Electric lift, heating and hot water installations are in operation. The laundry block is equipped with the most modern plant driven by oil fuel. A special feature of the isolation block is the sun wards on the north elevation.

- (5) Hornsby High School for Girls—Contract amount £41,579 10s.

This building is of brick with an external face of cement rendering and is of two storeys, with a basement section, in which are located the gymnasium and sanitary arrangements. Accommodation is provided for 768 pupils. An assembly hall is associated with the premises.

(6) Mitchell Library, Dixon Wing—Book Stacks. Contract amount, £10,755.

This installation of all metal construction is of the very latest type. Minute adjustment of shelving is provided for. Four tiers of shelving are arranged, with corridors floored with heavy plate-glass for diffusion of light throughout. In all 1,760 shelves are installed to carry the many tons of literature to be stored in a manner that will provide for immediate transfer of any particular volume sought by readers in the main reading rooms. The installation was made locally. A modern system of adjustable lighting is installed as also is an electric lift.

COUNTRY DISTRICTS.

From the detailed information given below it will be seen that a large number of both major and minor works, for all Departments, have been carried out under the supervision of the District Works Officers.

Briefly, the principal works (costing over £2,000) are as follows:—

No. 2 Division.

(Comprising the District Offices of Newcastle, Coff's Harbour, Lismore and Moree.)

Newcastle District.

Newcastle Mental Hospital—New Nurses' Quarters.—This building is constructed of brick on reinforced concrete foundations. The walls are two storeys high, cement rendered externally, plastered internally. The roof is covered with slates. There are twenty-four bedrooms, two recreation rooms, one dining room, kitchen, pantry and scullery. Lavatory accommodation is provided on both floors. The building has electric light and hot water services. Completed cost, £9,234 9s. 6d.

Weston Police Station—New Building.—Of brick construction; external walls cut and struck, black joints, internal walls plastered, tiled roof and fibrous plaster ceilings. There are three bedrooms, living room, kitchen, bathroom, pantry and laundry in the private quarters. In the official quarters there are charge room, two cells and exercise yard. Completed cost, £2,201 1s.

Bellbird School—Additions.—This contract covered the erection of four new class rooms, staff room, repairs and painting of existing building, new weathershed and lavatories, additions to Girls' w.c.'s. and new w.c. block for boys; all of timber frame construction, outside walls sheathed with rusticated weatherboards, walls internally of T. and G. pine linings, and ceilings of fibro-cement sheets pannelled out, complete with iron roofs. Completed cost, £3,717 12s. 11d.

Coff's Harbour District.

Coff's Harbour Police Station—Additions and Alterations.—Additions comprise court room, magistrate's room, C.P.S. office, Police office, fireproof store room, charge room, two cells and exercise yard, and four new w.c.'s. The whole constructed of timber on concrete foundations, roof of galvanised iron. Alterations comprise remodelling the old residence, renewing fences and constructing paths, and painting throughout. Work completed at a cost of £3,047 5s.

Walcha Cottage Hospital—Additions and Remodelling.—Remodelling portion of the main hospital and additions to the nurses' quarters, carried out in brick work with iron roof. Completed at a cost of £3,958 10s.

West Kempsey High School—New Building.—A new two-storey brick building with tile roof; comprising eight class rooms, two assembly halls, two staff rooms, Principal's room, four hat rooms, library, store, weathersheds for boys and for girls, two cycle sheds and two lavatory blocks; fencing round the whole of the area. Work carried out at a cost of £16,872 2s. 4d.

Armidale Teachers' College Hostel—Additions.—A two-storey brick structure with galvanised-iron roof; comprising bedrooms, lavatories and recreation room at the Hostel for Girls. Completed cost, £10,227 3s. 4d.

Armidale Teachers' College.—New brick building with slate roof; comprising class rooms, science rooms, library, woodworking room, assembly and concert hall, gymnasium. The building is centrally heated from the basement. Residence for the Principal—A one-storey brick building with slate roof. Cost of work to date, approximately, £98,327 7s. 8d.

Lismore District.

*Casino Intermediate High School.**—The buildings erected under this contract comprise: High School, domestic science building, manual training school, with the usual conveniences and playgrounds.

The High School is in two storeys, of brick construction, with fine cast and cement dressing externally, reinforced floors and stairs, fibro slate roof and plastered internally.

The planning and fittings are of modern type, all class rooms being well lighted, roomy and well ventilated.

The accommodation provided on the ground floor is two class rooms, staff room and Headmaster's room, and on the first floor three class rooms; corridors with hat and cloak rooms on each floor. The building is of fireproof construction and has seating space provided for 208 pupils.

The Domestic Science School is a self-contained, one storey brick building, with tile roof, and finished in a similar manner to the High School. The accommodation is cookery and serving-room, laundry, dining-room, teachers' room, dressing-room, store and bathroom, fitted throughout with the most modern appliances on hygienic principles. Space is provided for a full class of 48 to 50 pupils.

The *Manual Training School* is of wooden construction on brick piers, finished internally with lining, ceiled and roofed with iron. The working space is 50 ft. x 22 ft., and has an office and store room in addition. The fittings consist of twelve woodwork benches, tool racks, demonstration table and the necessary racks for timber. The room is well lighted, ventilated and up-to-date.

* These works were commenced prior to 1929-30, and were completed during the period under review.

The High School, Domestic Science and Manual Training Schools will accommodate approximately 256 pupils.

All buildings are connected with a septic service and a complete scheme of sewerage has been installed.

Completed cost of the work was £11,295 17s. 6d.

Murwillumbah High School.*—Brick buildings with concrete foundations, concrete reinforced floors and stairs, thereby reducing the fire risk to a minimum. The walls and ceilings are plastered. Walls externally are cement dressed and roof is tiled. The fittings throughout are of modern pattern and similar to those supplied to the larger schools.

The building has a basement fitted up as recreation room for male and female pupils, stores and lavatory accommodation, and connected to school on the ground floor.

Ground Floor.—Five class rooms and large assembly hall, Principal's office, hat and cloak rooms.

First Floor.—Two class rooms, assembly room, science rooms, staff rooms, preparation room, study and store-room, library and the usual hat room.

A complete drainage system has been laid and all sewerage is now treated by a septic tank.

Accommodation is provided for 294 pupils. Completed cost of the building was £18,766 7s. 2d.

Lismore Public School—New Building.*—The new two-storey brick building just completed is of modern type, replete in all essentials for comfort, hygiene and facilities for the advancement of education.

The building is constructed upon wooden piles driven to a depth of 40 feet, and upon these piles are reinforced concrete bearers. The position of the school being within the flood area, the basement has been treated as shelter shed and playground.

The structure is of brick with reinforced floors and staircase, thereby reducing the fire risk to a minimum. Walls and ceiling are finished in plaster and roofed with slates. Electric light has been provided on ground floor only.

Accommodation:—Basement—Shelter rooms, bicycle room, two lavatories, and stairs to upper floor.

Ground and First Floors—Ten class rooms (five on each floor), with folding doors dividing the rooms for conveniently forming into one large room for special purposes, large assembly room on each floor, hat room, Headmaster's room, and stairs to connect each floor.

The fittings and seating throughout are up-to-date and of the latest pattern adopted in the modern structure.

Under this contract a portion of the existing school was remodelled as domestic science school, and fitted with modern appliances for cooking and domestic work, including gas and electric stoves.

The old wooden building previously used for domestic science and infants' school has been converted into a shelter, science room, typewriting room, girls' class room, preparation room and hat room. This building has been lined, ceiled, and fitted with modern appliances.

The accommodation afforded by the additions are:—New boys' school, science room and girls' class room, additions to existing school.

The contract amount was £19,143 10s. 2d.

Note.

It might be noted that no major works costing over £2,000 were carried out in the Moree District, but the expenditure on minor works is shown in the schedule of expenditure for country districts.

No. 3 Division.

(Comprising the District Offices of Bathurst, Dubbo, Bourke, Broken Hill and Hay.)

Bathurst District.

Orange Mental Hospital.—Two Blocks for Sick and Infirm.—Two large single storey buildings, built of local bricks with roof of French pattern tiles. Completed cost, £38,036.

Orange Mental Hospital—Nurses' Home.—A large two-storey brick building, with roof of French pattern tiles. Completed cost £14,806.

Kandos Court House.—A new building, built of brick, and having a slate roof. The building is small but dignified, and is an acquisition to the town. Completed cost, £2,282.

Mudgee Public School—New Building for Infants.—A large single storey brick building with slate roof, and containing four large class rooms, assembly hall, kindergarten, staff room, lavatories, &c. Completed cost, £6,960.

Kandos Public School—New Building and Additions.—Additions to the existing school building, comprising two class rooms, corridors, &c., and conversion of old building into weathersheds; all of weatherboards, iron roofs. Also a new large two-storey brick building, having French pattern roof tiles. Completed cost, £7,966.

Dubbo District.

Dubbo Gaol—Additions and Alterations.—This work comprised the alteration of the entrance from Macquarie-street to the Court House grounds, the provision of brick trial yards, new entrance, and a new brick cottage for the gaoler. The total amount of contract was £4,206.

Dubbo High School—Additions.—This work comprised the addition of three brick class rooms and offices, with roofs and painting and repairs. Contract amount was £4,449 13s. 3d.

Note.

It might be noted that no major works costing over £2,000 were carried out in the Districts of Hay, Broken Hill or Bourke, but the expenditure on minor works is shown in the schedule of expenditure for country districts.

* These works were commenced prior to 1929-30, and were completed during the period under review.

No. 4 Division.

(Comprising the District Offices of Cootamundra and Port Kembla.)

Cootamundra District.

June District Hospital—New Building.—Buildings are of brick with tiled roof, and comprise main ward block, kitchen block, operating block with boiler house and steriliser, also children's ward block, and laundry block. The buildings are installed with electric light and heating services and septic tank installation, and are suitably designed and form an imposing block of buildings. Completed cost, £24,557 5s. 9d.

Weethalle Police Station—New Building.—Constructed of brick with iron roofs, and comprising residence, containing living room, two bedrooms, kitchen, bathroom, sleep-out verandah and office, also charge-room and store; two-cell lockup with exercise yard and garage with two-stall stable attached. Completed cost, £2,600.

Young Soldiers' Settlement—Prune Sheds at Kingsvale, Wirrimah and Maimuru.—The sheds are constructed with wood framing, lined externally with fibrous cement sheets and have galvanised-iron roofs with ventilating ridge and dormer windows. Each shed has spacious open preparing shed and enclosed clearing shed, together with distributing and receiving platforms. Completed cost, £15,987 17s. 1d.

Corowa Intermediate High School—New Buildings.—The buildings are of brick and wood with terra cotta and fibrolite tiled roofs respectively, and comprise main two-storey block, weatherboarded manual training room, cycle sheds, and lavatory blocks, and installed with electric light and water services and septic tank installation and site is suitably fenced in. Completed cost, £11,100.

Port Kembla District.

Kiama District Hospital.—Erection of new male and female wards, accommodating eight beds in each, two single wards and one two-bed ward, duty and board room, verandahs front and back. The operating block consists of operating room, sterilising, doctors' and anaesthetic rooms, complete with all latest modern fittings. Sanitary annexes are erected for male and female patients at each end of building, and contain bath and sink rooms and W.C's. Provision is also made for boiler room and linen presses.

Isolation block at rear of main building provides accommodation for three wards, duty room and sanitary annexes and verandahs.

Existing residence has been converted into matron and nurses' quarters and kitchen block, and access to same is gained by covered way from main building.

The erection of new morgue, hot water and steam services have also been provided, together with new septic sewerage service.

The buildings are erected in an elevated position and constructed of brick with tiled roofs and all appointments complete.

The total cost amounted to £15,380 16s. 9d.

Boural High School.

Erection of new buildings constructed of brick, walls cement rendered externally, and roofed with tiles. Lavatory blocks for boys and girls, weathersheds, and tuckshop have been erected at the rear of the main building and similar to same.

The main building provides accommodation for 408 pupils, and contains eleven class rooms, large assembly hall, corridors, male and female staff rooms, headmaster's office, library, and open balconies on each side of library, also science and demonstration rooms.

The building is erected in an elevated position, and the completed cost, including fencing, paths, assembly court and gas and electrical services, amounted to £21,211 16s. 10d.

EXPENDITURE.

Metropolitan District (No. 1 Division).—The expenditure for the year was £161,012 10s. 6d. from the votes of this Department, and £123,697 1s. 4d. on account of works supervised for other Departments.

Country Districts.—The expenditure scheduled hereunder covers the financial position in regard to the major works previously mentioned and also all minor works supervised by District Works Offices.

Districts.	Public Buildings.	Schools.
No. 2 Division—	£	£
Newcastle	22,451 18 10	8,126 16 10
Coff's Harbour	15,726 6 2	64,072 13 11
Lismore	5,263 0 0	27,144 0 0
Moree	2,781 18 11	754 13 5
No. 3 Division—		
Bathurst	90,676 10 11	17,603 8 1
Dubbo	7,287 11 2	1,305 7 8
Bourke	1,264 8 0	.....
Broken Hill	2,437 14 11	1,773 16 3
Hay .....	.....	159 10 0
No. 4 Division—		
Cootamundra	35,741 0 9	22,339 1 7
Port Kembla	24,214 9 2	25,100 17 10
Totals	£207,844 18 10	£168,380 6 5

MAINTENANCE WORK, &c.

A very great deal of maintenance work associated with the many public buildings has been carried out. As in previous years service has been given in connection with the building and renovation requirements of the Resumed Properties Department and also in connection with the Fair Rents Court, Hotel Licensing Authorities, and public functions.

ENGINEERING DIVISION.

The work of this section of the branch has proceeded in a similar manner to previous years, the level of expenditure and call upon its services being substantial as hitherto.

The main features of the past year have been the increase in maintenance and institutional services, and the introduction of motor transport for such works. As an instance of the savings that have resulted it may be mentioned that although the demand on electrical maintenance has increased 85 per cent., the total cost decreased £276.

Similarly, mechanical maintenance in obedience to similar factors has shown a decrease of £474 for the year, or a total of £750 for all maintenance services.

The following are special instances of works completed by this section during the year under review :—

Sydney Hospital.—Mechanical plant for the ward, casualty, and operating block.

This work is of special interest in that it is the largest casualty block of its kind in Australia and the mechanical equipment installed is the largest and most varied of any hitherto attempted in the State.

The cost of the work amounted to approximately £9,500.

Armida Teachers' Training College.—This plant embraces an extensive heating service requiring over 6,000 sq. ft. of radiation to give the requisite temperature rise during the winter period.

State Penitentiary and Female Reformatory, Long Bay.—This is another work of an interesting character, and comprises the erection of two Thompson water-tube boilers. It represents the first instance where the State has utilised vertical retort tar—a bye-product from the manufacture of gas—for steam raising purposes. The plant is operating satisfactorily, an unusual high thermal efficiency having been obtained, together with annual savings amounting to approximately £450 per annum. The completed cost of this work amounted to approximately £6,000.

EVAN SMITH, F.R.I.B.A.,
Government Architect.

Engineering Design Branch.

Annual Report, 1929-30.

I submit herewith report upon the operations of the branch for the twelve months period ended 30th June, 1930.

The Engineering Design Branch was formed by the amalgamation of the several engineering branch drawing offices of the Department under one head as from the beginning of the financial year. Its function has been the preparation of the designs, specifications and estimates for the contracts and all other engineering works carried out by the Department or proposed.

The work performed during the year included the following, the order of the list as shown being made to accord with the work attended to for the different branches.

Bridges.

Contract plans and specifications were prepared and tenders invited for the following bridges:—Macquarie River at Freemantle; George's River at Milperra; Lachlan River at Condobolin (stock bridge); Adelaide Camp (6) Muggabah and Merrimajeele Creeks, Ivanhoe to Booligal; Goulburn River at Martindale; Castlereagh River at Boybean (Dubbo); Duck River at Auburn (footway); Parramatta River at McArthur-street (footway); Barwon River at Dangar (near Walgett); Bokhara Bywash (Bourke District) 12-mile dam; Billabong on Bourke-road (Bourke); Cato Creek (near Brewarrina); Duck Creek, Girrilambone (near Nyngan); Belmore River at Gladstone (West Kempsey); Murray River at Bethanga; *Acacia, Yanco-winna and 25-mile Creeks (3); Broken Hill to Wilcannia; †Boomi River at Yarrawa, Mungindi (Moree); †Murray River at Mildura (hoisting gear for lift span); †Creek crossings on roads Hillston to Mossiel and Whealbah to Trida (4).

Harbour Works.

Designs and estimate were prepared for alterations at Lee Wharf, Newcastle; amended designs for Floating Dock Anchorages, Government Dockyard, Walsh Island; and for strengthening No. 4 Jetty, Port Kembla to take heavier loading.

Dredge Plant.

Detailed drawings were checked and examined for the following dredge plant constructed or under construction by the Government Dockyard, Newcastle—Two 130-ton silt punts (12); dredges "Alesus" 4; "Zeno" (10); "Hermes" (169); "Pluto" (36); two marine boilers, "Tempe" (conversion to electric drive)†. Also numerous returns, sketches, specifications, reports on tenders, &c., in connection with coastal harbour and dredge maintenance.

Swamp Drainage.

Preliminary designs and estimates were prepared for the following works of swamp drainage—Mooball and Crabbs Creek (extensions); Curl Curl Lagoon (relief channel); Tuckombil Swamp (flood escape).

Water Supply.

Preliminary estimates for new works were prepared for Southern Riverina towns, Manilla, Barraba, Gosford, and for improvements or extensions at Singleton, Tamworth, Taree, Wagga, Wyong, Werris Creek, Kiana, Moss Vale, Murwillumbah, Orange, Moree, Picton, Queanbeyan, Ballina, Bathurst, Cargelligo, Dubbo, Glen Innes, Goulburn, Inverell, Junee; also for lesser extensions at Katoomba, Condobolin, Balranald, Molong, and Tenterfield.

Contract plans and specifications were prepared for new works for—Scone, Coonabarabran||, Grenfell (part completed) and for improvements and extensions at—Junee§, Dubbo, Cargelligo, Moree, Forbes, Grafton, Werris Creek, Mittagong, Bathurst, Tumut, Picton, Mudgee, Katoomba, Orange, Deniliquin, Muswellbrook, Bowral, Broken Hill§, Wagga§, North Wagga§.

For minor extensions at Condobolin, Wellington, Cargelligo, Tamworth, Junee, Rabbit and Milson Island, Quirindi, Glen Innes, Inverell, Narromine, Wyong, Cowra, Hay, as well as for supply works at various mental hospitals and training colleges.

South West Tablelands.—This scheme apart from its magnitude possesses special features which has necessitated a considerable amount of additional work. The main supply works will be administered separately from the works of distribution, and numerous estimates have been required in connection therewith. The sizes of pipe lines and features connected with deaeration of the water have required numerous special designs not covered by the ordinary practice with regard to Country Towns Water Supplies.

Up to the present plans and specifications have been prepared for some nine contracts for the supply as far as Cootamundra, while others are in progress with regard to this section and the extensions beyond Cootamundra and northward toward Harden and Murrumburrah.

Sewerage.

Designs and estimate were prepared for extensive alterations and extensions to the sewerage at Bathurst, for a new scheme at Forbes (sewers, pumping station and treatment works), also for extensions at Lismore, designs for new treatment works being in progress.

Designs and estimates were prepared for extensions at Orange, Parkes and Narrandera; also for treatment works for the following district hospitals—Lower Clarence (Maclean), Junee, Grenfell, Coff's Harbour and Griffith. Preliminary estimates were prepared for new works or extensions in the cases of Albury, Armidale, Bowral, Goulburn, Corowa, and Gosford (S.W.C.).

* Not by contract.

† Not yet proceeded with.

‡ Designs prepared.

§ In hand or part completed

|| Not so far proceeded with.

Electrical.

Designs, &c., were prepared in connection with Burrinjuck and Port Kembla electricity supply systems, also as standards for more general use as follows :—

	Survey and Trans- mission Line.	Power House.	Sub- stations.	Wiring dia- grams.	Trans- mission Equip- ment.	Misc.	Total.
Burrinjuck Hydro-Electric Scheme	48	1	11	17	5	11	93
Port Kembla Hydro-Electric Scheme	4	4	7	2	...	3	20
Standards	10	...	19	...	15	4	48

Amended designs for No. 2 Power Station, Burrinjuck, altered in the light of information obtained as the result of the previous invitation for tenders, are now in progress.

A system of recording statistics for the Burrinjuck and Port Kembla systems has been introduced and these are kept regularly charted from information supplied.

The work of collection of statistics for the electrical undertakings of the State have been continued.

River Murray Works.

Detail designs for the Hume reservoir have been attended to as required. Drawings Nos. 58, 59, 60 for footways to dam, access to inspection galleries, were prepared and submitted for approval to the River Murray Commission. Contractors' detail plans for spillway gates and travelling crane (79) were checked and examined.

In addition to the foregoing, various other duties have been attended to from time to time by members of the Drawing Office staff such as the following—inspection and trials of dredge plant (new construction by Walsh Island); tests on pumping machinery for water supply and sewerage; inspection of ironwork for spillway gates for Hume Reservoir; testing of transformers, &c., also the relief of officers in other branches.

Standards Association.

The work of the Standards Association of Australia in its relation to the work of the Department came under consideration during the year. At the present time the whole question of the Department's representation on these committees of the Association is under review in order that it might be brought up to date and with the object of ensuring that the views of the Department should be accorded due weight on these committees, if the specifications drawn by them are to be adopted as the standard for Government requirements. While it is the intention that such representation should be limited to those matters where the interests of the Departments (or other Government Departments) is concerned so that the time of Departmental officers should not be unduly occupied with attention to extraneous affairs, it is hoped nevertheless to obtain greater benefit from this work.

Cement.—Consideration was given to the possibility of adoption of the Australian Standard Specification for Portland cement, as recently amended, for the supply of Government requirements for the next three years. The tests specified in the Australian Standard are, however, not high enough to comply with the required Government standard, thus precluding its adoption.

Several economies in administration have been brought about during the year.

As a result of re-arrangement of duties of officers following upon the amalgamation and by non-replacement of vacancies as they occurred, it has been possible to effect a total saving in salaries of £5,159 per annum.

As a result of arrangements made for dealing with certain business aspects of the work substantial savings have been effected in the matter of annual contracts, cast-iron pipes, &c., also in printing, having in floor space and in other directions.

Another matter that received consideration was freight on pipes for water supply purposes. An analysis of the cost of the various works for country towns water supplies which have been carried out in the past disclosed an undue proportion of expenditure in railway freight on this item. On investigation this was found to be due to the fact that the railway rolling stock was not being used to its maximum load carrying capacity. By means of improved methods devised in the branch, substantial savings are being effected and will continue in the future.

The staff at the present time consists of the following officers—professional and general, 48; clerical, 3; total, 51. Officers in all sections have shown keen interest in the work of the Department and made every effort to cope with the special calls made on them during the year.

G. B. CARLETON, M.Inst.C.E.,
Principal Designing Engineer.

24th July, 1930.

Survey and Survey Drafting Branch.

General survey, drafting, heliographing, plan mounting and recording were carried out in connection with the following works.

Murray River Waters Act.

Border Railway Agreement (Bridge approaches at Euston) Hume Reservoir and Locks Nos. 12, 13, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26 and 27.

Country Towns Water Supply.

Coonabarabran, Barraba, Bathurst, Blue Mountains Villages, Broken Hill, Bundanoon, Central Western Plains, Cobargo, Cowra, Dubbo, Dungog, Gosford, Grenfell, Hunter District, Manilla, Mittagong, Morisset Mental Hospital, Moree, Moulamein, Orange, Parkes, Scone, South West Tablelands, Southern Riverina, Tamworth, Taree, Wingham, Werris Creek and Yass.

Sewerage.

Albury, Armidale, Bathurst, Bowral, Carrington, Corowa, Dubbo, Forbes, Glen Innes, Goulburn, Hornsby District Hospital, Ifield, Junee District Hospital, Katoomba, Lithgow, Lismore, Parkes, Moree, Moss Vale, Orange, Rydalmore District Hospital, Singleton and Wagga.

Stormwater Channels.

Narrandera, Newcastle (Cottage Creek Channel).

National Roads.

Federal Aid, Menindie-Wentworth and Kuring-gai to Cowan Creek.

Bridges.

Murrumbidgee River at Currawarna and Mulwala.

Harbours and Rivers.

Bellinger River, Byron Bay, Camden Haven, Lake Macquarie Entrance, Macleay River Entrance, Manly Lagoon, Moscheto Island (Oyster Leases), Nambucca River, Narrabeen Lagoon, Newcastle Harbour, Port Kembla, Port Macquarie, The Spit (Mosman), Shea's Creek and Wagonga Inlet.

Swamp Drainage.

Calliope, Glenrock and Tennessee, North Oxley Island, Oxley Island and Tuckean Swamp.

Electric Schemes.

Burrinjuck, Morisset Mental Hospital and Port Kembla.

Public Watering Places.

Plans and descriptions were prepared in connection with the establishment of six watering places—four were revoked and nine others were partly revoked.

General.

Miscellaneous drawings including plans, sections, diagrams, capacity curves and tables totalling 239 have been prepared, together with 373 plans and descriptions for resumptions, easements, appropriations, &c., also five detail sheets were drawn and tracings prepared.

Helios to the number of 36,220 were printed and 2,400 maps were mounted. This includes (as well as work for this Department) heliography and plan mounting for the Railway and Tramways, Education, Valuer-General's and Fisheries Departments.

In the Plan room 2,546 new plans and 350 field and level books were registered and 14,400 plans, &c., were issued by and returned.

The number of files dealt with was 5,184.

Survey.

On 12th February last the constitution of the branch was altered by the addition of the surveying officers, the branch being placed under the direction of the Officer-in-Charge of Surveys.

Field surveys were carried out in connection with the following:—Hunter District Water Supply Amplification, South West Tablelands Water Supply, South Grafton Water Supply, Hume Reservoir, Nambucca River Entrance, Camden Haven Entrance, Coff's Harbour, Byron Bay Jetty, Port Kembla and Burrinjuck Hydro-Electric Development, Eastern Suburbs Hospital Site, West Wyalong Hospital Site.

T. G. WILSON,
Officer-in-Charge of Surveys.

Director of Public Works,
19th September, 1930.

Testing and Inspection Branch.

Annual Report, 1929-30.

The work carried out by the Testing and Inspection Branch during the year shows a slight falling off compared with the work of the previous year.

The estimated value of the material sampled, tested and inspected before being sent forward from the various works amounted to approximately £1,099,338, a decrease of £283,962 on the previous year's operations. Fees charged for the work carried out amounted to £11,374, a decrease of £130.

Cement Testing.

One thousand and twenty-two (1,022) certificates covering the sampling and testing of 3,020,420 jute bags of cement of an estimated value of £713,154 were issued during the year. This is 290,434 bags less than the number tested during the previous year. Fees amounting to £6,070 were charged for the work carried out—a decrease of £545.

Steelwork Inspection.

Twenty-six thousand four hundred and twenty-one (26,421) tons of steel rails, structural steel, pig iron, cast-iron pipes and castings, and mild steel pipes in addition to 3,131 valves and hydrants, and 38 miscellaneous jobs were tested and sent forward from the various manufacturers at Newcastle and Lithgow. Seven hundred and forty-seven (747) consignments were sent forward. While the tonnage shows a decrease, both the estimated value, £384,254, and the fees, £3,615, charged for the work carried out shows an increase of £11,000 and £457 respectively.

Miscellaneous Investigations.

Seven hundred and twenty (720) reports covering 2,454 tests of concrete cubes, iron and steel bars, asphaltum, paints, &c., were carried out. Fees charged for the work performed amounted to £1,688 16s. 2d.

Two hundred and twenty-two (222) instruments were overhauled and repaired by the instrument maker.

Summarised details of the work carried out are given in the following statement :—

Particulars of Service.	Unit.	Quantity.	Reports.	Tests.	Estimated Value.	Fees.
					£	£ s. d.
Cement Testing	Bags	3,020,420	.....	1,022	713,154	6,070 0 0
Steelwork Inspection—						
Rails and fishplates	Tons	15,429	.....	.....	188,189	1,352 2 2
Structural steel	"	2,663	.....	.....	34,619	371 3 8
Pig-iron	"	913	.....	.....	5,478	11 8 1
Cast-iron pipes and castings	"	3,103	.....	.....	50,574	574 14 8
Mild steel pipes	"	4,313	.....	.....	94,706	1,186 0 0
Valves and hydrants.....	No.	3,131	.....	.....	8,484	75 7 9
Miscellaneous jobs	"	38	.....	.....	2,204	44 8 2
Miscellaneous Investigations—						
Concrete tests .....	.....	.....	391	1,493	.....	592 15 0
Sand.....	.....	.....	17	48	.....	98 16 0
Stone .....	.....	.....	1	6	.....	3 0 0
Iron and steel.....	.....	.....	159	585	.....	237 1 0
Paints, oils, &c. ....	.....	.....	30	50	.....	118 6 3
Asphaltum	Gals.	51,480	20	82	1,930	115 5 4
Miscellaneous .....	.....	.....	102	190	.....	238 6 4
Standardised sand	Cwt.	143	.....	.....	.....	285 6 3
Instrument maker	No.	222	.....	.....	.....	.....
Totals .....	.....	.....	.....	.....	£1,099,338	11,374 0 8

A. MORRISON,
Superintendent of Testing and Inspection.

The Director.

Walsh Island Dockyard and Engineering Works, Newcastle.

Annual Report, 1929-30.

The financial year just completed is the third year in succession with a very high turnover and a satisfactory financial position. Although the general slump was felt during the latter half of the year under review, Walsh Island again showed a profit.

During the year the value of the work carried out was £680,000, aggregating nearly three million pounds for the last three years, absorbing 2,600 men during portion of this period and nearly 2,000 as an average.

The principal work carried out during the year closed on the 30th June, 1930, was :—

The completion of the Walsh Island Floating Dock, which is now docking ships regularly ;
and the manufacture of :—

- 11 miles of 18-inch diameter steel pipes for Broken Hill water supply.
- 31½ inch diameter steel main for water supply at Killara.
- 48 steel railway carriages for Sydney City Railway.
- 26 trucks for Water Conservation and Irrigation Commission.
- 800 aluminium swing doors for Railway Commissioners.
- 2 rail tank waggons for Atlantic Union Oil Company.
- Pipes for Tarro boosting plant.
- Gwydir steel bridge for Main Roads Board.
- Construction of a Diesel driven oil carrying vessel for Vacuum Oil Company.
- Construction of Customs vessel for Commonwealth Government.
- Construction of barges, dredge and ship repairs.

Besides much of the work for the year showing considerable savings to the various Government Departments, in consequence of the work being obtained by tender, and apart from the aspect of goodly profits made, the large volume of work successfully completed in the last three years has proved the capacity of Walsh Island and its possibilities.

The problem at the moment is to continue to secure a turnover of work in keeping with the capacity of the works, and which volume is necessary to continue to show a sound financial position. A great activity in shipbuilding or rolling stock manufacture is necessary, or a fair volume of activity in both.

In tendering for contracts it is found that all engineering work is very finely cut in price and that even with the present tariff wall, it is difficult and impossible in some cases to compete with suppliers from overseas.

There is, and will be, a fairly good volume of work in hand from electrically-welded mild steel pipes, a fair volume of general engineering work for industries in the district, and throughout Australia, and miscellaneous work for the collieries.

Ship repairs and dockings are increasing as the coal trade and port activity improve.

Recently we tendered for the Wellington Floating Dock, but the economic conditions overseas made it possible for the British builders to carry the heavy charges of the long tow and insurance and tender very much below our best figure.

Piece-work has improved conditions and results at Walsh Island considerably, but such systems already prevail among our overseas competitors, and at a basis wage rate of about one-half that existing here.

In all these circumstances, this large and valuable plant requires fostering with help of State and Federal Governments until industries such as shipbuilding can be revived.

The history of this and kindred establishments in Australia is marred by periodical substantial falls in numbers employed, many of the men having to wait unemployed about the district for conditions to improve.

We have been fortunate in having three record years in succession, but I would stress the desirability of establishing some definite policy throughout the country to find and employ means of providing for and making possible a more regular growth of these industries. It often happens that many large works terminate about the same time, with no developmental work to follow.

In the meantime, this establishment seeks the co-operation of Australian Commerce, Government Departments, Boards and Councils—

Towards securing sufficient work for the large numbers of operatives who await more regular activity.

Towards placing these works in a stronger position to establish the important national industries here (the general work helping to absorb standing charges, depreciation, &c.).

Towards continuing to make a financial success to the State and the people and maintaining the position Walsh Island deserves in the Nation.

It seems, from our own local point of view at Walsh Island, that we have reached a difficult period in manufacture, inasmuch as our local and Government requirements have reached a volume which is reasonable and desirable to supply from local manufacture, but which only gives intermittent activity.

The plant has now been adapted to manufacture steel pipes, steel railway carriages, trucks, skips, buildings and the like. However, these supplies are only required spasmodically, a still further handicap for us, as against mass and continuous production countries. It is in this consideration that Walsh Island requires as much general work and support therefrom as can be obtained.

The staff and men have worked wonderfully well to achieve the results obtained and deserve every consideration during the present slump, which has necessitated a rationing scheme being introduced.

A. C. WATERS,
General Manager.

15th October, 1930.

Ladder Dredge.	Where Working	Material Lifted.	Tons Lifted.	Hours Dredging Working	Hours Working	Expenditure £. s. d.	Pence per Ton	Cost per hour. Dredging £. s. d.	Cost per hour. working £. s. d.	Percentage of Working hrs.						Remarks	
										Dredging	Coaling	Removals	Bad Weather	Waiting for Pumps	Repairs		Other causes
Clarence.	Newcastle	Mud	293,450	801	2,185	8750 17 4	7	10 18 6	4 0 1	1 37 3	4	5 12 9	30				
Hunter.	do.	Mud Sand	742,500	884	2,188	12941 2 5	4	14 12 9	5 18 3	40 3 4	1	1 28 23					
Juna.	do.	Stone Clay Rock Mud	280,550	907	2,148,	6940 3 2	6	7 13 1	3 4 7	43 2 4	2	2 25 22					
Richmond.																	
Totals							1,316,500	2,592	6,521	28,632	2	11					
Averages								5	11 1 0	4 7 10	40 3 4	3	5 20 25				

Large Sand Pump Dredge	Where Working	Material Lifted	Tons Lifted	Hours Dredging	Hours Working	Expenditure £ s. d.	Pence per Ton	Cost per hour					% of Working hours						Remarks
								dredging £ s. d.	working £ s. d.	Cast per hour	Dredging	Coaling	Removals	Bad Weather	Disposal of silt	Repairs	Other causes		
Ballina	Hot	in	Commission	3,100	11 6														Construction of 2 new Boilers
Antleorn.		do.		do.		425 6 2													
Hexham	Newcastle	Mud. Sand	227,848	952	2,165	8,102 18 8	5	8 10 2	3 14 16	44 -	27 1	-	10 18						Out of Commission since 20.4.30
Fibronia	do.	Sand	157,715	579	1,709	4,884 7 9	7	8 8 2	17 2 33	2 9	1 14	3 38						" 21.8.29 to 31.10.29	
Stockton	do.	Mod. Sand	327,160	1,359	2,778	9,884 18 11	7	7 5 5	3 11 2	49 1	13 1	-	13 22						
Harrington	Richmond River	do.	52,125	582	2,156	5,057 9 1	24	8 13 9	2 6 16	28 4 19	1 -	29 19							Extensive overhaul
Antleorn.	Swampy Grounds																		
	Batemans	Sand	158,830	456	2,347	12,918 10 8	20	28 6 7	5 10 1	20 5 5	16 14	20 20							Working Shallow Bar
	Charvona																		
	Pt. Macquarie																		
Latona	Swampy Grounds	Sand	185,000	545	2,209	12,297 19 3	16	22 11 3	5 11 4	25 7 5	15 6 21	17							Working Shallow Bar
	Bechnopen																		
Jupiter	Swampy Grounds																		
	Richmond	Sand	411,500	331	2,241	11,588 11 6	7	35 0 2	5 3 6	15 6 9	4 10 40	17							
Tethys	Swampy Grounds																		
	Richmond	Sand	275,450	806	2,267	9,170 1 7	8	11 7 6	4 1 0	36 7 11	6 9 11	20							
Neptune	Swampy Grounds																		
	Bechnopen																		
Totals	Swampy Grounds																		
	Bechnopen																		
Averages							9	13 9 5	4 5 2	31 9 12	5 7 16	20							

for 12 Months Ended 30th June 1930

Small Sand Pump Dredge Working	Where Working	Material Lifted.	Tons Lifted.	Hours Dredging	Hours Working	Expenditure £. s. d.	Pence per Ton.	Cost per hour dredging. £. s. d.	Cost per hour Working. £. s. d.	Percentage of Working Hours.							Remarks.
										Dredging	Coaling.	Removals	Bad Weather	Waiting for Pumps	Repairs	Other Causes	
Bellingen.	hot in	commission															
Botany.	Newcastle	And Sand	103,051	970	2,448	4,447 0 9	10	4 11 8	2	1 4 45	3 15	1 10	26				
Forster.	Lape Hawk	Sand	80,565	1,026	2,136	3,295 2 7	10	3 4 2	1	10 10 48	2 9 4	1 9	17				
Gosford	Shea's Creek	Sand And clay	106,508	1,147	2,147	4,566 14 8	10	3 19 8	2	2 7 53	1 16	1 18					
Macksville.	Sambucus River	Sand	91,580	764	2,160	3,770 0 11	10	4 18 8	1	15 0 36	1 10 3	37 13					
Maclean.	Blairance River	Shingle Debris Gravel	23,322	1,247	2,154	2,939 3 2	30	2 7 2	1	7 3 58	1 5 11	10 15					
	St. Stephens	Sand	61,955	875	2,148	4,528 14 1	17	5 3 6	2	2 2 40	3 11	1 3	14				Out of Commission Since February conversion to Electric Assembly and running trials.
	Locks River	clay And Sand	6,382	813	2,147	2,125 0 6	80	2 12 3		19 9 38	4 -	46 4					
	Locks River	And Sand	12,819	944	2,47	2,314 4 11	43	24 12 5	9	7 5 38	8 10	6 38					
Totals			486,482	6,936	15,257	27,986 1 7											
Average							14	4 0 8	1	16 6 45	1 8 6	22 18					

MONTHS CHARGED TO DATE 1900

Grab Dredge.	Where Working.	Material Lifted.	Tons Lifted.	Hours Dredging.	Hours Working.	Expenditure.		Pen- ce per Ton	Cost per hour		% of Working Hours.						Remarks.	
						£. s. d.	d.		£. s. d.	hour	Dredging.	£. s. d.	hour	Working.	£. s. d.	£. s. d.		£. s. d.
Como.	Locks River	And Sand Rock Clay	17,925	928	2,181	3,358	14 0 45		3 12 4	1 10 9	43 4 3	1 1 28 20						Removal of Lock Locks R. Entrance.
Coraki.	Richmond River	And Sand Timber	9,129	419	2,153	2,313	16 8 61		5 10 5	1 1 6	20 3 21	5 1 28 22						Working with Transport Year.
Harwood.	Tweed River	Sand Clay And	21,062	1,357	2,156	1,937	7 10 22		1 8 6	18 0 63	6 8 5	9 9						
Minmi.	Newcastle Lock	And Rock	14,008	886	2,299	5,208	2 4 89		5 17 6	2 5 4	39 2 17	5 4 12 21						Removal of Lock. Newcastle Entrance.
Urunga.	Hambro River	Gravel And	29,063	1,047	2,148	2,633	12 8 31		2 10 3	1 4 7	49 1 20	5 8 17						
Wallsend.	Newcastle	And clay Rock	94,655	1,236	2,229	3,801	13 10 10		3 1 6	1 14 1	57 2 7	4 7 6 17						
Wickham.	Newcastle	Gravel And Rubbish	34,865	913	2,146	5,565	2 11 38		6 2 0	2 12 0	43 6 7	5 24 13						
	Totals.		211,707	6,786	15,312	24,818	10 3											
	Averages.						28		3 13 1	1 12 5	46 4 10	4 2 16 18						

12 months ended 30-June 1930

Tug or Hopper Barge.	Where employed	Tons Toned	Miles run Towing	Miles run special service	Total Working Hours	Hours attending	Cost of Towing		Cost of Special Service		Cost per ton Towing		Cost per mile Special service		Cost per hour attending		Working Hours		Repairs		Weather		Remarks										
							£.	s.	d.	£.	s.	d.	s.	d.	s.	d.	s.	d.	£.	s.	Bad Weather	Other Causes											
Cardiff.	Newcastle	91,370	3,855	-	2,157	1,066	4,539	3	5	-	-	11.9	23	6	-	41	1	53	2	34	3	5	1	11									
Casino.	Richmond River.	4,600	1,587	588	954	840	671	-	10	128	-	36.0	8	5	4	4	16	9	19	1	40	3	12	-	45 Past time Pilot Duty.								
Croki.	Cook's River	16,525	1,330	46	2,178	1,434	748	8	1	20	18	7	10.9	11	3	9	1	7	1	10	9	26	2	34	1	37							
Eden.	Newcastle	72,673	2,194	1,757	2,215	1,623	2,508	14	3	2,678	2	0	8.3	23	-	30	6	4	10	6	3	10	38	5	27	2	38						
Hamilton.	do.	123,640	1,645	197	2,299	2,299	4,047	9	1	484	4	1	7.9	49	2	49	2	39	6	39	6	50	3	20	2	25							
Hinton	do.	100	7	5,115	2,376	2,138	5	15	8	3,085	1	3	138	16	6	12	1	26	-	29	-	52	4	10	-	34							
Mayfield	do	-	-	8,714	4,107	3,903	-	-	-	2,034	-	11	-	-	-	4	8	9	10	5	-	53	5	5	-	35							
Moruya.	do	-	-	2,423	2,555	2,356	-	-	-	3,154	17	2	-	-	-	26	-	25	1	26	10	5	1	2	7	-	40						
Paterson	do.	45,470	821	1,485	2,445	2,306	1,572	4	6	2,843	13	16	8.3	38	3	38	2	36	1	38	3	58	4	5	1	32							
Taree	do.	12,205	1,842	3,575	2,081	2,006	1,225	2	3	2,444	19	4	24.1	13	3	13	8	35	6	36	9	44	2	4	-	50							
Waratah.	do.	174,400	1,812	247	2,187	2,059	2,586	3	2	352	10	6	3.6	28	6	28	7	26	10	28	7	63	3	6	4	22							
Grafton	do.	384,750	2,984	-	2,203	1,812	6,064	16	2	-	-	-	3.8	40	8	-	-	53	1	67	-	27	1	18	1	53							
Lismore	do.	357,750	2,806	-	2,203	1,766	6,633	9	8	-	-	-	4.4	47	4	-	-	60	1	75	1	25	1	20	1	53							
Orestes	do	157,450	1,641	-	2,147	1,390	3,152	18	2	-	-	-	5.0	38	5	-	-	29	5	45	-	4	1	36	1	48							
Rhea.	do	127,900	1,370	-	2,147	1,557	2,910	7	0	-	-	-	5.6	42	5	-	-	27	1	37	6	12	-	27	2	59							
Totals.		1,562,933	23,894	24,147	34,224	28,555	36,165	12	3	17,252	7	8	-	-	-	-	-	5.6	30	9	4	2	3	1	6	37	8	40	2	19	1	38	
		Averages.																															

Costs by Ladder Dredges (with Towing) for periods as stated.

Ladder Dredge.	Where Working.	1 st July 1928 to 30 th June 1929				1 st July 1929 to 30 th June 1930				Remarks.
		Dredging Towing and Repairing				Dredging Towing and Repairing				
		Tons.	Expenditure. £. s. d.	Pence per Ton.		Tons.	Expenditure. £. s. d.	Pence per Ton.		
Clarence.	Newcastle	268,950	14,997 19 3	12.6	293,450	15,751 6 8	13			
Hunter.	Newcastle	518,000	22,157 11 0	10.3	742,500	25,803 18 3	8			
Juno	Newcastle	363,660	18,630 19 10	12.3	280,550	12,854 4 9	11			
Gansdowne RICHMOND.	Port of Commission	- - -	182 6 5	-	- - -	- - -	-		Dismantled + hull sunk at sea.	
		1,150,600	55,068 16 6	11.5	1,316,500	54,409 9 8	10			

done by Large Sand Pump Dredges (with Towing) for Periods as Stated.

Large Sand Pump Dredge.	Where Working	1 st July 192 to 30 th June 192			1 st July 192 to 30 th June 192			Remarks.
		Tons.	Expenditure £. s. d.	Pence per Ton d.	Tons.	Expenditure. £. s. d.	Pence per Ton d.	
Morpeth Ballina.	OUT OF COMMISSION		17 11 2	--	--	425 6 2	--	
CHINDERA	do	do	294 5 5	--	--	3,100 11 6	--	Construction of two new boilers
Hexham.	Swindon	29,117	4,486 2 6	36.9	--	--	--	Dismantled & hull sunk at sea.
Fibronia	Newcastle	307,402	6,768 7 10	5.3	427,848	8,102 18 8	4	
Stockton.	do	300,456	9,240 6 4	7.4	157,715	7,931 14 10	12	
Harrington.	do.	23,150	4,813 4 9	49.9	327,160	9,884 18 11	7	
Antleam.	Richmond	179,436	5,721 2 8	17.6	52,125	5,527 13 2	25	Extensive overhaul
	MACLEARY R. NARROGOON R. CLARENCE R. Swindon R. MORRISON R. MARTIN R. PORT KEMBLA WOLLONGONG PORT MERRIMAN	199,970	12,841 11 7	15.4	158,830	12,918 10 8	20	Working shallow Bar.
Jupiter.	NEWCASTLE COFFS HARBOUR RICHMOND R. CLARENCE R. BYRON BAY	564,000	23,826 7 11	10.1	411,500	11,588 11 6	7	
Latona.	MANNING R. MACLEARY R. BELLINGON R. Swindon R. CANDON HARBOR	189,200	13,956 5 8	17.7	185,000	12,297 19 3	16	Working shallow Bar.
Iethys.	MACLEARY R. CLARENCE R. RICHMOND R. NEWCASTLE	223,650	11,627 16 4	12.0	275,450	9,170 1 7	8	
Neptune.	GUNNAMAHTA BOTHANY BAY MANNING R. COWAN R. BELLINGON R.	178,750	13,478 0 11	18.1	198,825	7,716 12 11	9	
		2,095,125	107,201 3 1	12.3	3,194,453	88,635 4 2	10	

done by Small Sand Pump Dredges (with towing) for periods as stated.

Small Sand Pump Dredger.	Where Working.	1 st July 1928 to 30 th June 1929				1 st July 1929 to 30 th June 1930				Remarks.
		Dredging		Towing and Repairing		Dredging		Towing and Repairing		
		Tons.	Expenditure. £ s. d.	Pence per Ton.		Tons.	Expenditure. £ s. d.	Pence per Ton.		
Bellingerr.	Out of Commission	- -	372	7 11 - -	- -	- - - -	- -	- -		
Botany.	NEWCASTLE	78,385	4,264	18 5 13.	103,051	4,447	0 9 10			
Forster.	CAPE HAWKE	112,980	3,231	17 10 6.9	80,565	3,295	2 7 10			
Gosford.	COOKS River	112,132	4,931	13 3 10.6	106,808	4,566	14 8 10			
Macksville.	NAMBUCCA River.	87,890	4,365	3 2 11.8	91,580	3,770	0 11 10			
Maclean.	CLARENCE River	23,476	4,330	14 4 44.3	23,322	2,939	3 2 30		Working with Grad in Gravel and Shingle	
Swansea.	PORT STEPHENS.	192,855	3,623	18 8 6.7	61,955	4,528	14 1 17			
Tempe.	COOKS River	9,976	2,464	15 4 59.2	6,382	2,125	0 6 80		Out of commission since delivery. Conversion to Electric	
Zer0	COOKS River	- - -	- - -	- - -	12,819	2,314	4 11 43		Only in commission since May 1930	
		554,694	27,585	8 11 11.9	486,482	27,986	1 7 14			

done by Grab Dredges (with towing) for periods as stated.

Grab Dredge	Where Working	1 st July 1928 to 30 th June 1929				1 st July 1929 to 30 th June 1930				Remarks.
		Dredging Towing and Repairing		Pence per Ton.	Tons.	Dredging Towing and Repairing		Pence per Ton.		
		£.	s. d.			£.	s. d.			
Como	Locks River	74, 765	4, 035	14 10	12.9	17, 925	4, 107	2 1	55	Removal Lock boxes Lower Entrance
Coraki	Richmond River	12, 205	2, 031	14 6	39.9	9, 129	2, 514	13 2	66	Working with Transport. Gear
Harwood	Sturt L.	22, 693	2, 153	9 6	22.8	21, 062	1, 937	7 10	22	
Minmi	Newcastle	57, 763	5, 556	8 8	23.1	14, 008	7, 054	6 4	120	Removal Lock, 2 1/2 L.
Urunga	Langbuesco River	15, 024	2, 517	0 10	40.2	20, 063	2, 633	12 8	31	
Wallsend	Newcastle	117, 345	8, 860	0 5	18.1	94, 655	8, 376	14 4	21	
Wickham	Newcastle Manning L.	38, 050	5, 192	6 3	32.7	34, 865	5, 565	2 11	38	Working in gravel and shingle.
		337, 845	30, 346	15 0	21.5	211, 707	32, 188	14 7	38	

Class of Dredge.	1 st July 1928 to 30 th June 1929					1 st July 1929 to 30 th June 1930				
	Tons Lifted.	Hours Dredging	Dredging Only		Dredging and Towing		Tons Lifted.	Hours Dredging	Dredging Only	
			Expenditure £.	Average Cost per ton d. s. d.	Expenditure £.	Average Cost per ton d. s. d.			Expenditure £.	Average Cost per ton d. s. d.
Ladder.	1,150,600	2,322	26,559 10 0	5 11 8 9	55,068 16 6	11	1,316,500	2,592	28,632 11 5	11 10 54,409 9 8 10
Large Sand Pumps.	2,095,125	7,052	104,005 5 9	11 14 13 9	107,201 3 1	12	2,194,453	6,321	85,147 8 0 9	13 9 527,986 4 2 10
Small Sand Pumps.	554,694	7,470	26,991 0 9	11 3 12 4	27,585 8 11	11	486,482	6,936	27,986 1 7 14	4 0 8 27,986 1 7 14
Grabs.	337,845	7,027	23,484 12 0	16 3 6 10	30,346 15 0	21	211,707	6,786	24,818 10 3 28	3 13 1 32,188 4 7 38
Totals Etc.	4,138,126 4	23,871	181,040 14 6	10 7 11 1	220,202 3 6	12	4,209,142	22,635	166,584 2 9 10	7 6 10 203,249 15 0 12
	Add cost of services of Tugs on work other than Bridge Service									
				13,851 4 2					17,252 7 7	220,502 2 7
				234,053 7 8						