



CITY OF MACKAY
TOWN PLANNING
SCHEME

Queensland
1934

PRESENTED TO

PIONEER SHIRE COUNCIL

by

**JAMES COOK UNIVERSITY OF NORTHERN QUEENSLAND
MACKAY CAMPUS**

**FROM THE ESTATE OF
IAN WOOD AM**

(Former Senator and Mayor of Mackay)

April 1992

Senator Ian Wood.
Victoria St.,
Mackay

Ferguson St.,
1-8-58

Dear Ian,

You ask what do I think of the proposal to use Jubilee Park for a civic centre. My belief is that it is too small for the purpose & if used there should be another block put in with it. Access to it is poor.

My conception of a civic centre is a place which will provide at least.

- (i) A civic hall
- (ii) A large space for the assemblage of crowds.
- (iii) Municipal offices
- (iv) Court house
- (v) Child minding & health centres
- (vi) Public library, museum art gallery.

To my idea these buildings should be arranged around the open space so as to give an sense of enclosure but such a centre must be near traffic arteries to enable the quick assembly & dispersal of crowds. It must also be near adequate parking.

It will be a tragedy for this city if a long sighted view is not taken.

As you know we have prominent citizens, who are so unimaginative as to say that the plan

grounds, with a little enlargement, are adequate for 200 years.

With the area required what is wrong with the longer proposal for putting the civic centre on the existing show grounds & on reclaimed land.

It has these advantages

(i) One of the most urgent things required for Mackay is to build up the mangrove area from the cemetery to the western end of Victoria St. & prevent flooding of the city such as we had this year. Next time such a flood occurs the damage will be much greater.

Reclamation for the civic centre could be integrated into this scheme.

(ii) It can be given good access

(iii) It will be on the edge of the main business area but close to it.

(iv) It will be easily accessible from neighborhood

(v) Plenty of parking space can be provided

(vi) Provision of land here by reclamation will be cheaper than buying up built up areas. In fact the only occupied area which will be affected is the show ground which really should now be shifted.

Yours sincerely,
Charles Barton.

PLAN OF
General Development
for
THE CITY OF
MACKAY



REPORT OF
THE CITIZENS' ADVISORY TOWN PLANNING
COMMITTEE

and

R. A. McINNIS, F.Q.I.S., M.T.P.I.
Consultant Town Planner

TO
THE MACKAY CITY COUNCIL.
1934.

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Marshall St., The Valley,
Brisbane.

Letter forwarding the Scheme.

Victory Chambers,
Queen Street,
Brisbane,
December, 1933.

The Town Clerk,
The Mackay City Council,
Mackay.

Dear Sir,

In accordance with the instructions of your Council contained in your letter dated 19th December, 1932, I have the honour to submit herewith a Town Planning Scheme for the City of Mackay, and the Report thereon. These have been prepared in conjunction with the Citizens' Advisory Town Planning Committee, appointed in pursuance of a resolution of the Council passed at a meeting held on the 24th January, 1933.

At that meeting I pointed out to your Council that, success in gaining much of the information required in the Civic Survey rested upon the willingness of both the Council and the citizens to assist; that many decisions would have to be made, which would materially affect the planning, and which would be of importance to the future of the city; and that it was advisable that the various interests affected should be given every opportunity to record their views and to assist in the planning.

I therefore asked the Council to appoint a Citizens' Advisory Town Planning Committee to assist me in the preparation of the Scheme. If that were done the plan would be to a great extent the citizens' plan, and not an arbitrary scheme, prepared by someone who would not be present while the scheme was being carried out. If the citizens assisted in the preparation of the scheme they would have a stake in it, which would create a strong local interest in its fulfilment.

This led to the appointment of the committee that has assisted me in the preparation of the scheme. This report has been adopted, and is submitted to your Council by me in conjunction with the Committee. Its members have given their services voluntarily, because of their interest in the progress of, and their civic pride in their city, and its members should remain as a permanent advisory body to assist the Council in bringing the scheme into effect.

To be successful, any scheme of city development must be comprehensive, taking into account all those factors in the city's growth that may effect the planning. Every attempt has been made to make this scheme comprehensive, and to take into account all that was absolutely essential, but the necessity for economy has limited research which might, or might not have proved productive.

It is only possible to take present conditions and indications into account in estimating future requirements, and should new and unforeseen conditions arise, provision must be made to accommodate them by amending the scheme. This can always be done without losing the benefits which it has created.

The conditions under which the Civic Survey was carried out could not have been pleasanter than they were. Every assistance was afforded me by the Town Clerk, the City Engineer and the whole of the staff of the Council, while the Mayor and Aldermen and those citizens with whom I was brought in contact, did everything possible to help the scheme forward.

It was very difficult to estimate the time that would be required to prepare the scheme as there was no precedent to guide one, and it has taken considerably longer than I expected. However I feel confident that the time spent upon it will prove to have been worth while.

The aerial survey, which could not be obtained until the civic survey was almost completed, has proved invaluable in the preparation of the report. Indeed, it is difficult to see how the report could have been completed, except on the spot, without the photos, which were referred to continually, and always supplied the information desired.

Luckily it does not make much difference to this scheme whether the Proposed Outer Harbour is constructed or not, because it will be placed well outside the City area, and the only connections between it and the City will be the existing road bridge and a railway bridge in continuation of Brisbane Street. If it is built, however, it will probably make a considerable difference to the suburb known as North Mackay, situated in the area of the Pioneer Shire Council. It will be almost essential, in that case, to have that area planned. A bad and extremely disorganised form of development is taking place there now, but it could not be dealt with in this scheme because it is not within the jurisdiction of the City Council, and because the physical features interposed between it and the City render it an entirely separate problem.

North Mackay is in the unhappy position of being a growing town situated on the fringe of a large shire, the interests and thoughts of whose Council are entirely agricultural. On the other hand, it is so completely separated from the City that to extend the city boundaries to include it would not be economically sound at present. However, it is purely a suburb of the City, not a self-contained town, and it seems inevitable that the City must embrace it some day.

The sea-side resorts at Eimeo, Seaforth, and Slade Point are other areas which, although outside the influence of the City Council, are dependent upon the City for their development. Their attractiveness will undoubtedly suffer in the absence of planning, as is generally the case elsewhere. There does not seem to be much prospect at present of having schemes prepared for them, but there can be no doubt of their desirability.

Yours faithfully,

R. A. McINNIS, F.Q.I.S., M.T.P.I.,
Consultant Town Planner.

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Introduction.

Mackay is a coastal city in the State of Queensland, situated 600 miles north of Brisbane and 235 south of Townsville by rail. It has a population of approximately 10,700, ranking tenth in size in the State. It lies on the south bank of the Pioneer River, and embraces an area of 8 square miles.

Mackay is the commercial centre and port of a large and fertile sugar producing district, and has grown with, and as a result of the expansion of the industry. However, it originally came into being as the port of the rich pastoral country of which Nebo is the centre, and the pastoral industry still ranks second in importance to Mackay. The Dairying Industry has expanded rapidly during the last decade, while the production of tobacco is now receiving considerable attention.

The difficulty of explaining what is meant by Town Planning is now, to a great extent overcome. A Town Planning Scheme, or Plan of General Development, has here been made for the first time in Queensland. Actual practice has shown how the principles of town planning can be applied to our problems. Every city or town has its own difficulties, and what has been done in Mackay would not entirely apply to them, but this Report and Plan, prepared for a small city, show how the principles that have already been used in some of the large Capitals, can be applied, and enable one to judge the value of planning to such a community.

"Investment in a good plan, whether it be for new parts of a city or for the correction of older parts, if regarded for a year may appear expensive; if considered for a period of five years will be profitable; when considered for a period of fifty years will be an investment which, in subsequent days, the community will regret was not adopted sooner."

JOHN BURNS,
The Father of Town Planning
Legislation.

The Civic Survey.

HISTORICAL OUTLINE.

The Pioneer River was discovered in 1860 by Captain John Mackay, while travelling overland from Rockhampton in search of fresh pastoral country. He established himself in the district in 1862, and during that year, stores for the rapidly forming pastoral holdings were first landed on the bank of the river by a vessel named the "Presto." Captain Mackay used this vessel to survey the roadstead and estuary of the river, and his survey enabled the authorities in Brisbane to declare the river a port of entry. The river received its name from H.M.S. "Pioneer," which was conducting a survey of the coast at the time.

The first plan of Mackay in the office of the Surveyor General, in Brisbane, is dated June, 1863. It was surveyed by Surveyor J. H. Fitzgerald, and shows the Town Sections 1 to 57 designed as they exist to-day. The surveyor had named the township "Alexandra," but the authorities changed it to "Mackay" in honour of the man who had discovered the river. The plan provides for two Park Squares within the town, one where the Drill Ground is, the other now being occupied by the Railway Yards. The surveyor's description of the site, written on the plan, reads as follows:—

"The town site is on a nearly level plain, in general dry, the land being of very good quality, and with the exception of a few patches of scrub, lightly timbered with Gum and Tea Trees, and covered with grass 6 to 7 feet in height at the time of survey. Permanent fresh water is said to be obtainable in wells at a depth of 30 feet, or may be procured about six miles up the river, or by land carriage from large lagoons about three miles from the town. The river is navigable for boats at high water, about eleven miles above the township. Tide, 15 to 9 feet."

The steamer then discharged at the end of Carlyle Street.

The chief events in the History of Mackay may be placed chronologically as follows:—

1864 Flood and cyclone. Writing in 1912, old settlers who were still living stated:—"For the extent of the area affected, the flood of 1864 has never since been exceeded."

1866 Newspaper published; Bank (A.J.S.) opened; Telegraphic connection established; and Sugar Cane planted.

It became evident to the pioneers that the country was suitable for something better than grazing purposes. Maize was tried, while cotton and coffee were also grown. It seems to have occurred to John Spiller, who had some knowledge of sugar-cane, that it should grow well. He imported plants and grew them on the north side of the river. J. H. Fitzgerald, the surveyor, introduced a further consignment and planted them near the present site of the Post Office.

1867 Kanakas were first imported to work on the sugar plantations.

1868 The first sugar-mill commenced crushing. This was "Alexandra," a mill built through the efforts of Mr. Fitzgerald. Mr. Spiller's mill, the "Pioneer," commenced crushing about the same time.

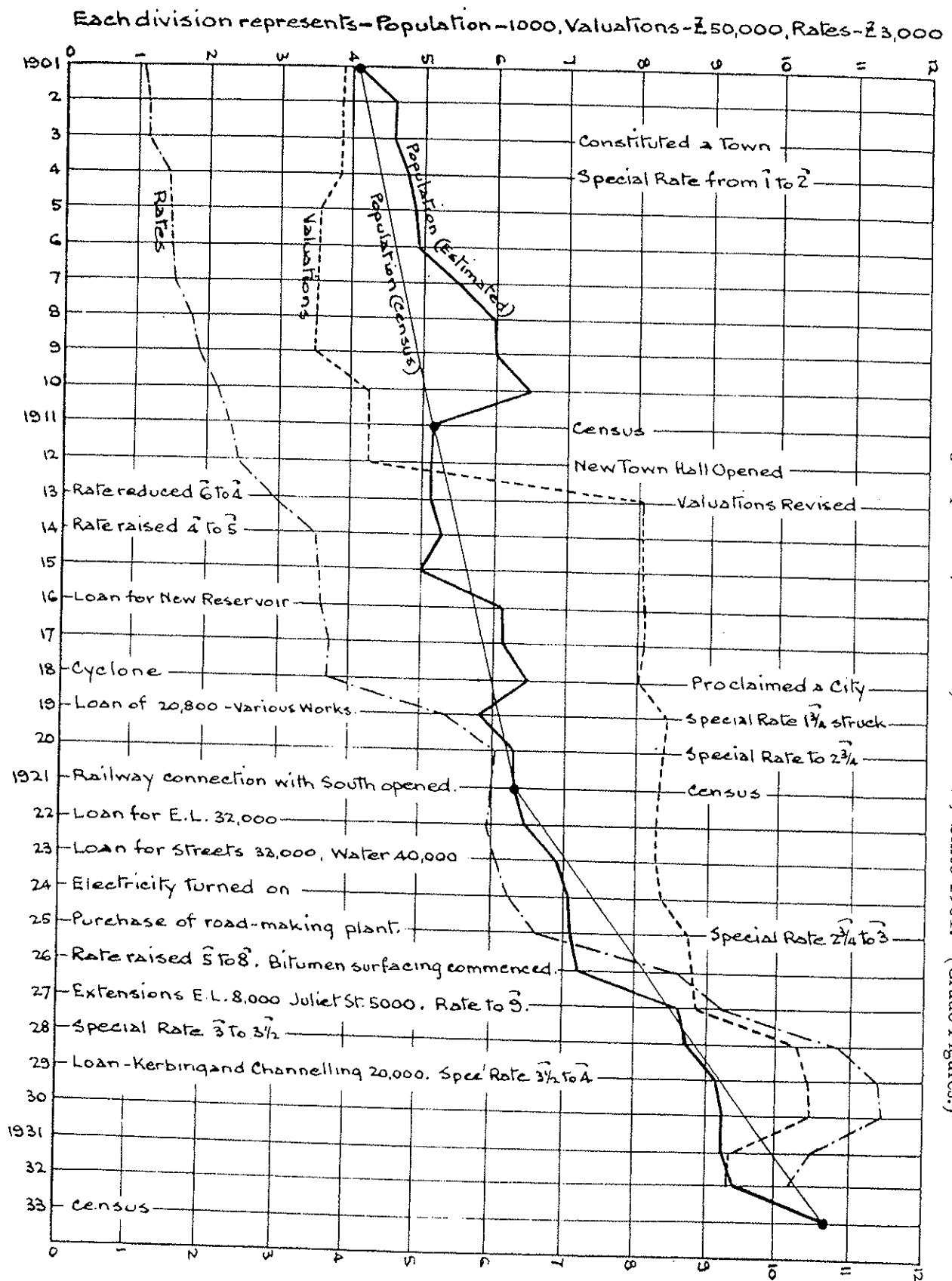
1869 Mackay was proclaimed a Municipal Council, thus conferring the first local governing powers upon the town.

1870 There were still no formed streets. All wheeled traffic entered the town via North Street, there being merely a bridle-track along Victoria Street.

1871 The first State School was opened.

1872 There were still no bridges across the river, travellers using several crossings on horseback at low tide.

- 1875 A year of great adversity for the district, almost the entire sugar crop being ruined by a disease known as cane "rust." Many of the young plantations were unable to withstand the blow, and were forced to close down.
- 1879 The Pioneer Shire was proclaimed as a local authority.
- 1883 Captain Mackay, returning to the town, describes it thus:—
"I saw on a plot, familiar to me as an area fringed with mangrove swamp, an embryo city, with well-formed streets and stately buildings, while the background was studded with handsome villas, overlooking well-tilled fields of sugar cane, stretching as far as the eye could see."
- 1884 The Railway to Mirani was opened.
- 1885 The three wards were created. Sydney Street bridge was opened.
- 1896 The Mackay Harbour Board was constituted.
- 1898 Another year of disaster, the town and district being swept by the "Eline" Cyclone. It was not, however, an entirely ill wind, for it opened a more direct channel between the river and the anchorage at Flat-top.
- 1899 The water supply for the town was completed, the water being obtained from a well at "The Lagoons."
- 1902 The importation of kanakas was prohibited by Act of the Federal Parliament, and their return to their island homes ensured.
- 1903 Mackay was constituted a town.
- 1912 The present Town Hall was built. The Sarina Shire was proclaimed as a Local Authority.
- 1914 The Mirani Shire was proclaimed.
- 1918 Mackay was proclaimed a city. A disastrous cyclone again swept the town and district. The heaviest annual rainfall was recorded.
- 1921 The rail connection with Rockhampton and Brisbane was opened.
- 1924 The Electric Light and Power Station was completed and the electricity turned on.
- 1926 The bitumen surfacing of roads was commenced.



Historical Graph, Mackay, showing Population, Valuations, and Rates, Since 1901. (Cude Figures.)

THE PRESENT CITY.

Mackay owes an increasing debt of gratitude to Mr. J. H. Fitzgerald, the surveyor who prepared the first town plan. His foresight has provided the city with a nucleus which could hardly be planned more perfectly to-day, to provide for the requirements of the present city. Mr. Fitzgerald, in 1863, found a small settlement, consisting of about two dozen huts and tents, straggling along a track, running nearly parallel with the river. They stood dotted about along a line joining the Pioneer Shire Council Office, and the corner of Brisbane and Victoria Streets. By ignoring the suggestion of placing streets parallel with the river he saved them from being swept by the prevailing strong winds. By making his streets 150 links wide, he has provided sufficient space to save the City from serious traffic difficulties. By covering such an unusually large area with his first plan, he provided a regular lay-out for most of the land even now occupied by the City. He seems to have made only one omission, and that is to provide a central square. If he had placed one where the settlement then was, it would still be in the centre of the business area. However, he cannot be blamed even for that omission, as it was not the practice at that time to provide such squares in Australian planning, and it would have been difficult to foresee its architectural importance. Had it been provided then, it would probably be occupied now by Government Buildings.

The trouble with planning in Mackay has mainly occurred in the land surrounding the first design. This was designed later by the same surveyor, and the land lying between Paradise Street and the Hospital was surveyed by him. Little fault can be found with that area as an original suburban layout. But he marked the land now occupied by sections 58 to 62 "For future subdivision" without suggesting the method of subdivision. He certainly showed Milton Street, Juliet Street, and Goldsmith Street each one chain wide, but suggested their eventual widening on subdivision by showing one side of each with dotted lines only. One can hardly imagine that he himself would finally have left these roads only one chain wide, leading as they do from a complete system of roads $1\frac{1}{2}$ chains wide.

In the eventual subdivision of these lands, the possibility of continuing the original road system seems to have been lost sight of by the Lands Department. Not only did the Department fail to continue them, but it subdivided the land into five acre blocks in such a manner that it was impossible for most owners, when individually re-subdividing, to place their roads in continuation of those in the original town.

Matters were further complicated in sections 58 to 62 by the coming of the railways. The positions of the lines were well chosen—interfering as little as possible with subdivisions existing at the time, but, in placing the main passenger station, its relationship to the remainder of the town does not seem to have been considered and a problem of access has been created, which it is now impossible to solve in a thoroughly satisfactory manner.

The year of the founding of Mackay is accepted as 1862, and a Jubilee commemorating the founding was celebrated in 1912, the date of the building of the Town Hall. A most interesting publication was issued at that time by the "Daily Mercury," in which personal accounts of their experiences, and of the early days in the town and district, were gathered from original settlers who were still living. No trouble was spared to obtain as full an account as possible of the early history of Mackay, and I am indebted to that publication for a great deal of the historical information I have used.

In 70 years the settlement, started as the port of Nebo, has grown into an important city, with a population of 9,400, a rateable value of £466,000, and an annual income from rates of £31,000, acting as the port and commercial centre for a district comprising the Shires of Pioneer, Mirani, Sarina, and Nebo, with an additional population of 14,000.

Mackay is supplied with water, for which in purity and softness, it would be hard to find an equal, pumped direct into storage tanks and mains without treatment, from wells tapping an old bed of the river at "The Lagoons" about three miles from the town. Electric light and power are supplied from an up-to-date power house, owned and operated by the City Council. Gas is supplied very efficiently, by a private company.

Railways follow up the Pioneer Valley, connecting the City with Netherdale and Eton, while the main coastal line passes through Mackay, connecting it with Cairns and Brisbane. An efficient local passenger service is maintained on these railways by means of rail motors. There is a registered aerodrome situated within two miles of the City, maintained by the Council. The port is controlled by the Mackay Harbour Board,

consisting of representatives elected throughout the district. Practically all produce and supplies still pass through the port. The Harbour Board has almost completed negotiations for building a new harbour, which will be situated on the coast-line, about three miles north-east of the City.

The City Council operates a Russell Sanitary Disposal System which is very efficient, but hopes soon to commence installing a Water Carried Sewerage System, for which preliminary plans have been prepared, and negotiations almost completed. The District General Hospital is situated within the City Boundary, and is controlled by a board. A scheme of modern buildings is under construction, which, when completed, should make the hospital as up-to-date and efficient as any of its kind in Queensland. There are also several good Private Hospitals within the City. The death rate of the City of Mackay for the year 1932 was lower than that of any city in Queensland, while the Natural increase was the highest.—Remarkable testimony of the healthfulness of the climate, and the cleanliness of the City.

All streets and roads in the central part of the City, covered by the first design prepared by Mr. Fitzgerald, are one and a half chains wide. This gives ample width for traffic, while in residential streets and those outside the main business sections, there is also room for a generous scheme of tree-planting. Practically all roads and streets bearing even residential traffic, have a bitumen surface. The margins are generally grassed, while horse-drawn traffic is almost non-existent, with the result that there is practically no dust. The road surfaces are good throughout the whole of the city area.

The general appearance of the city is clean and pleasing. There are not many large industrial undertakings within the City, the sugar-mills being scattered throughout the district, adjacent to the areas which supply them with cane. Thus there is very little smoke, and this fact added to the absence of dust, is responsible for the fresh, clean appearance of the buildings. In the main business quarter the public buildings, the banks, and some of the larger shops are good, and would be worthy of a much larger city.

THE GROWTH OF POPULATION.

Before commencing to plan for the future of any town, it is essential to gain a fairly accurate knowledge of the rate and nature of its growth, so that ample provision can be made for future extension, not only of the town as a whole, but also of its component parts, such as those devoted to Commerce and Industry.

An important source of inquiry is the booklet of Local Government Statistics, issued by the Registrar General. These can be obtained for each year back to 1900 and provide the recorded populations of all local government areas. Thus the course of growth of a town and a comparison with the growth of others within the State can be obtained.

The census years were 1901, 1911, and 1921, and the population figures shown for those years are accurate. The figures for inter-censal years are supplied by town-clerks, using what means of estimation are available to them. The figures reveal the fact that in some cases there has not been any attempt at accuracy, while in others there may have been changing conditions that have made the estimation difficult. As there was not a census in 1931, and the period since that of 1921 contained years of abnormal spending by most local authorities, and therefore years of abnormal growth, it is difficult to say what value can be placed upon the present estimates of the population of the different cities. In the case of Mackay the estimate is probably fairly accurate. The present Town Clerk has held office since a few years before the last census, the system of estimation has been continuous, and all available means have been used to obtain accuracy. It was therefore decided to accept the present estimate of 9,400 as being correct, but this figure will be subject to correction when the result of the census to be taken this year is available.

The rate of increase during the period from 1901 to 1911 was 2.3 per cent. per annum. From 1911 to 1921 it was 2.1 per cent., while from 1921 to 1931 it was 3.4 per cent. The last ten years contains a period of undoubted boom, and it would be wrong to project that rate of increase into the future. Since 1921 the City of Mackay has borrowed approximately £150,000, most of which has been spent in the locality. Its indebtedness has increased from £4/2/4 to £15/0/3 per capita. These figures are sufficient to indicate the abnormal nature of the period.

Unfortunately no record is obtainable of the increase of population in Mackay before the year 1900, but for some Australian cities there are records covering the boom in the 80's and the depression in the 90's,

and their effects on the curve of population have been studied. Rapid increases in urban populations almost invariably accompany increases in manufacturing activity within the boundaries of the town. Mackay is not a manufacturing city, although it is the centre of a district in which both primary and secondary industry are carried on. Its increase in population has been steady and continuous, but slow in comparison with other cities. Unless its nature is changed and it becomes a manufacturing centre, large increases in population cannot be looked for. It depends mainly upon the progress of the sugar industry, which was fairly continuous during the decades 1901 to 1911 and 1911 to 1921. Can we look for equal progress during the next decade? If not, an increase of population equal to the increase during those decades is hardly likely to be attained. The importance of the sugar industry to the City of Mackay cannot be stressed too much.

A continued increase in the dairying industry in the district would not affect the population of the town to any great extent, for if butter and cheese factories were built they would be scattered throughout the district. If the proposed harbour is built, it will result in a temporary increase of prosperity in the City, while money is being spent locally upon its construction, but it is not held that the provision of a harbour will increase the port trade of Mackay to a great extent, and a large permanent increase of population is not likely to be the result. In short, one cannot visualise at present, any possibility of the rate of absorption of population surpassing that of the years 1901 to 1921, as a result of industrial expansion.

Mackay bears the distinction of having recorded the lowest death rate among the cities of Queensland last year, while its birth rate is among the three highest in the State. The City thus has the largest natural annual increase of population in Queensland. The average for the last five years is 15.18 per 1000 or 1.5 per cent. of the population. This figure is not likely to be maintained for long. The natural increase is diminishing throughout Australia, chiefly owing to the rapidly falling birth-rate. It was 15.1 in 1921, 9.5 in 1931 and 8.3 in 1932. It will thus be seen that if we omit immigration, the population of Mackay is increasing at almost double the rate for Australia, and as it has not the power that other cities possess of absorbing an increase, it is probable that a large number of people, born and reared in Mackay, will seek a livelihood elsewhere.

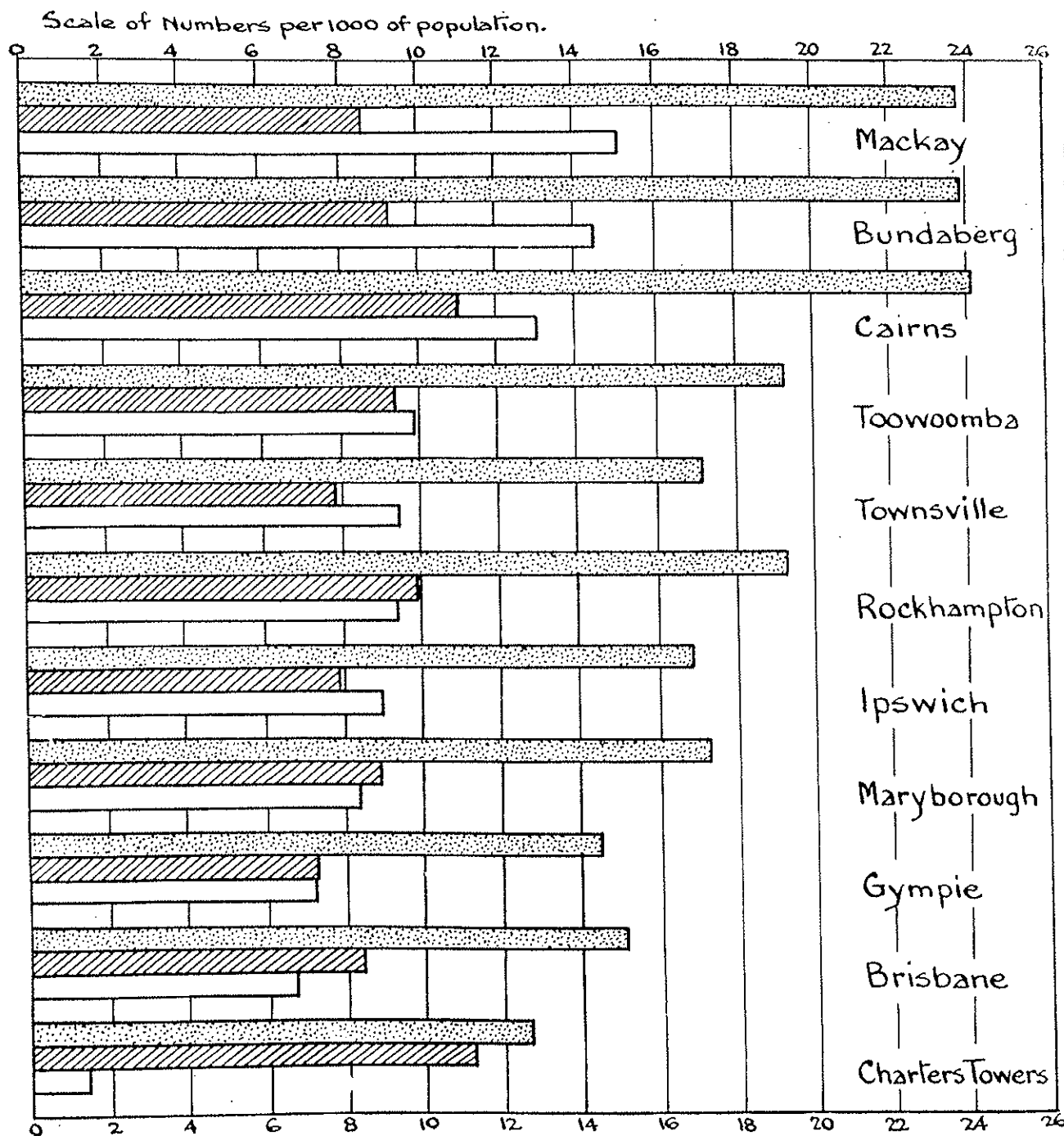
Having taken everything into consideration, it has been decided to accept the rate of 2 per cent. per annum as being the probable rate of increase of the population of Mackay during the next ten or twenty years, and to look upon the estimate as one that will not be exceeded.

At this rate the population would be about 11,500 in ten years, and 14,000 in 20 years.

ADDENDUM.

Although the results of the census that was taken this year are not yet officially available, it is understood that the population recorded for the Municipality of Mackay is 10,745. It therefore follows that there has been an annual increase of 4.5 per cent. since 1921, instead of 3.4 per cent. as estimated. This does not affect the estimated increase of 2 per cent. for the future, but it alters the estimated population. An increase of 2 per cent. per annum applied to 10,745 in 1933 gives a population of 13,100 in 1943 and 16,000 in 1953. These figures have been used in estimating future requirements in this report.

Queensland.
Cities.—Vital Statistics.
Births. Deaths. and Natural Increase. per 1000 of population
Average for 5 years.—1928-1932.



TOPOGRAPHY,

The City is built on a gently sloping alluvial plain, not intersected by watercourses. The slope is so even that it was not considered necessary to have a contour survey prepared. Many spot levels were obtained from the City Engineer, and these, with the positions of the existing main drains, were sufficient to reveal the flow of water and the higher parts of the area.

The ground is only slightly elevated above high water mark in the lower parts of the town, the official heights of the railway stations above high water being as follows:—

The old passenger station and railway yards	5 feet
The new Central Station	8 feet
Kemmis Siding	9 feet
Mackay West Station	22 feet
Paget Junction	22 feet
Mooralea (at the Racecourse)	28 feet

To the north-west, and to the east and south-east of the City within the city area are mangrove mud-flats, covered by salt water at high tide. Although these flats are an eyesore and a breeding-place for mosquitoes at present, they could gradually be reclaimed, and provide extensive playing areas and parks, close to the City.

The Pioneer River bounds the city area on the north and north-west, while the sea-front bounds it on the east. Along the west boundary, and within the city area, is the Lagoons Reserve, including the State Sugar Experimental Farm. This reserve contains the water supply works of the City. The banks surrounding the lagoons on this reserve are the highest ground in the area.

Most of the land situated to the south and east of the railway running from Paget Junction to the Central Station is low-lying, and presents almost insuperable drainage difficulties. It is fortunate for the City that so large an area in this locality was reserved as a Town Common, thus preventing its development. The remainder of the land in this locality should be declared unfit for further building development, which should be encouraged to the westward of the southern railway, on the higher land, which slopes gradually from the Lagoons towards the City, and from which most of the storm water drains off into the low-lying ground described above.

CLIMATIC CONDITIONS.

The average annual rainfall in the City of Mackay over a period of 61 years is 66.8 inches, which mostly falls during the first three months of the year. From July to October, both inclusive, the average rainfall is less than two inches per month.

The mean maximum temperature for the hottest month, December, is 86.2 degrees, while the mean minimum for the coldest month, July, is 52.8 degrees. The highest temperature recorded was 99.8 degrees in January, 1915, while the lowest was 36.4 degrees in July, 1918.

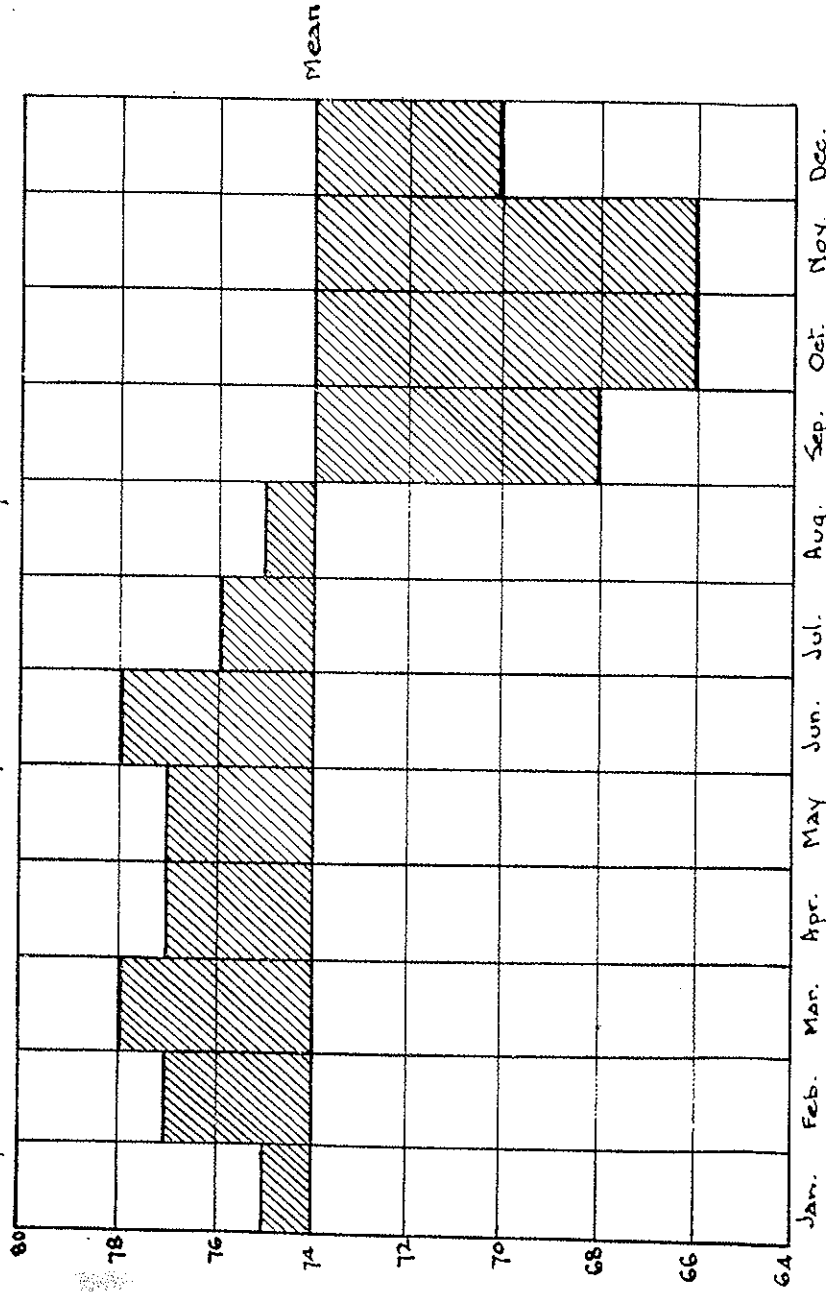
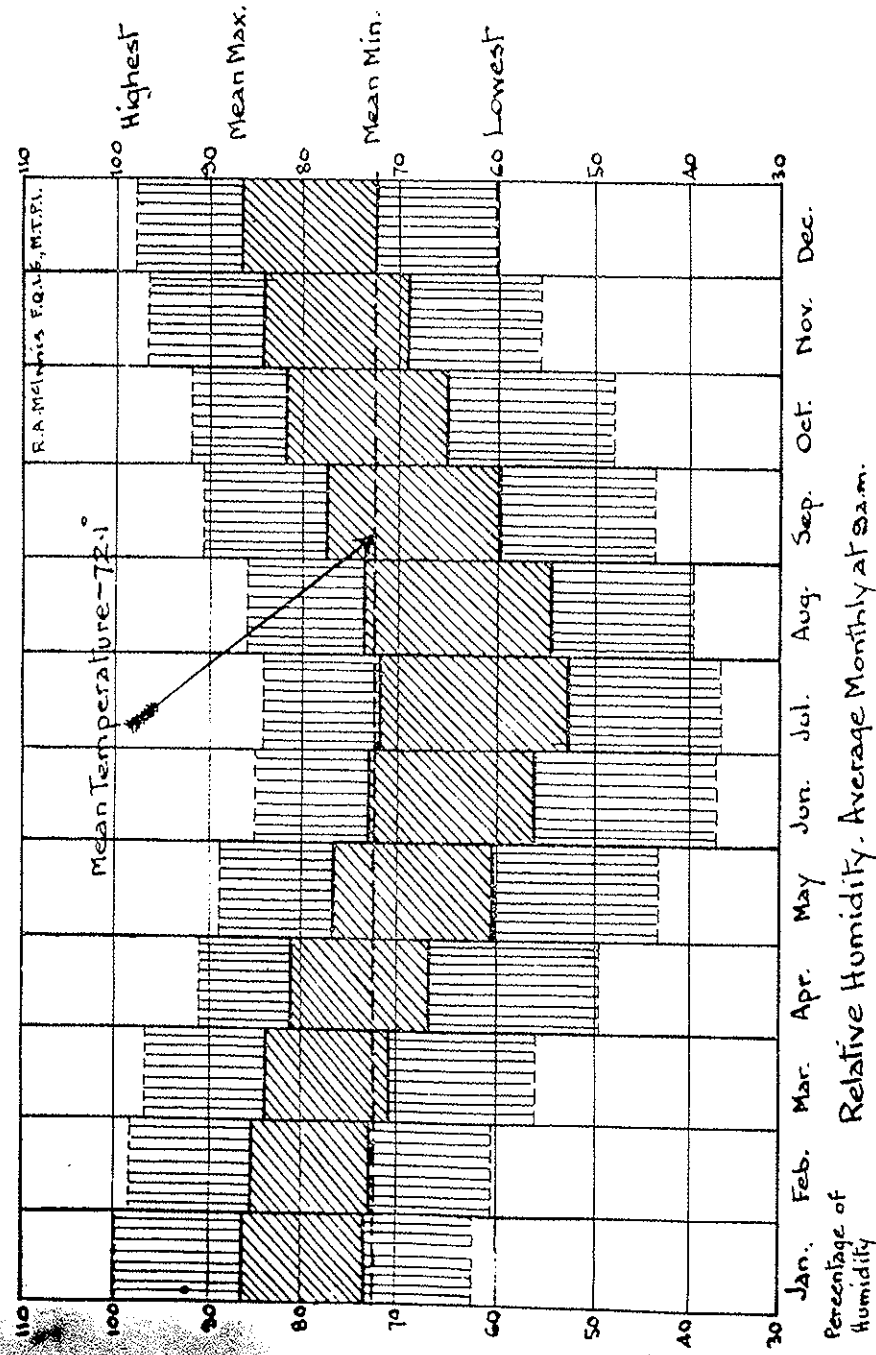
The relative humidity is about 76 per cent., varying very little from month to month from January to August, but it drops to an average of about 68 per cent. from September to December.

A graph showing the monthly averages of rainfall, temperature, and humidity is appended.

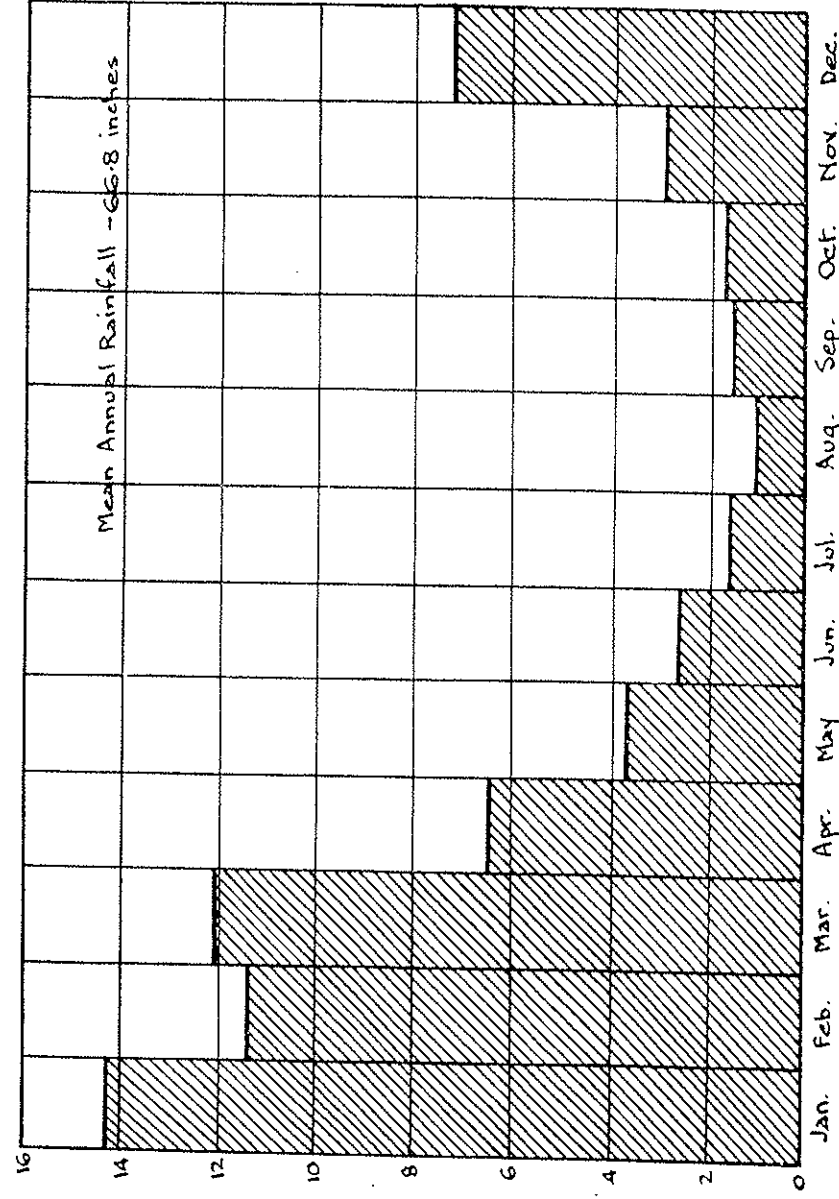
Generally speaking the temperature is not subject to rapid changes, and although the climate from December to March is generally hot and muggy, it would be hard to find a more pleasant climate from April to November.

Mackay Average Monthly Temperatures. From Commonwealth Bureau of Meteorology.

Degrees of
Temperature.



Average Monthly Rainfall (61 years)



S. of Mackay over a period of three months inclusive, the average temperature was 72.1°F. The hottest month, December, recorded 99.8 degrees in July, 1918. The temperature, however, varies very little, dropping to an average of 64°F in January. The rainfall, temperature, subject to rapid changes, March is generally hot and dry, while the winter climate from April

VEHICULAR TRAFFIC.

A *Traffic Census* was not taken in connection with this survey, as the vehicular traffic has not reached a stage at which its regulation has become a particular problem of planning. The wide streets in the centre of the city, with proper regulation, should provide ample circulation for many years to come.

During 1932 there were 15 traffic accidents within the city area, in which two persons were killed and 13 injured. One person was killed and six were injured in accidents with motor vehicles, and one killed and seven injured in accidents with bicycles. None of these occurred at intersections.

All railway crossings are necessarily level crossings in a city with the configuration of Mackay. There are 16 such crossings within the city area. There have been serious accidents at several of them, and improved warnings of the approach of trains are needed where the traffic is heaviest.

The most dangerous intersections in the city are at the junctions of Juliet and Milton Streets with Shakespeare Street.

The composition of the traffic in Mackay has a distinct character, as will be seen from the following traffic count, taken by the City Engineer on the 14th October, 1931. The day was a Wednesday and the count extended over the whole 24 hours. The count was of all vehicles passing the points, without any distinction as to direction.

	Sydney Street Bridge.	Mackay- Sarina Road.	Percent- ages of total traffic.	Brisbane Victoria Bridge 1925 Percent.	General Census Melbourne 1926 Percent.
<i>Motor-Power</i>					
Motor-cars	297	540	32.6	33	37.4
Motor-trucks	76	92	6.5	22	17.0
Motor-cycles	21	58	3.0	2	7.1
			42.1	57	61.5
<i>Horse-Power</i>					
Horse wagons	2	32	1.3	12	7.8
Sulkies	73	84	6.1	8	6.7
			7.4	20	14.5
<i>Man-Power</i>					
Bicycles	712	589	50.5	12	15.7
	<u>1181</u>	<u>1395</u>	<u>100.0</u>		

(Heavy passenger-carrying vehicles make up the balances for Brisbane and Melbourne.)

The characteristics at once noticeable are, the large number of bicycles, and the small number of horse-drawn vehicles. These are, to a great extent, the result of the large proportion of bitumen surfaced roads which exist both in the City and radiating from it into the country. The flat nature of the City and its surroundings is another factor in the number of bicycles, a large number of which carry two people each to and from work.

These counts were taken at the northern and southern entrances to the City. Had further counts been taken within the City, they would undoubtedly have revealed a still greater proportion of bicycles.

An idea of the great percentage of bitumen surfaced roads may be obtained from the following figures, taken from the report of the City Engineer, dated 28th February, 1933, giving the total lengths of each type.

Bitumen surface—23.4 miles.

Metalled surface—2.08 miles.

Earth formation—17.98 miles.

Most of the earth formed roads, although within the City area, pass through land devoted solely to farming. Taking business and residential streets only, the percentages are as follows:—

Bitumen—70 per cent.

Metalled—6 per cent.

Earth—24 per cent.

Another characteristic of the traffic is the large number of vehicles which visit the city from the country. As already pointed out, Mackay is the commercial centre for a large and populous district, and country-people come into the City to transact their business, and return, in most cases, the same day.

Twenty years ago this traffic was entirely horse-drawn. There were large livery stables in the centre of the town, where buggies and sulkies were housed for the day, for a small fee. It would have been neither safe nor humane to leave horses standing in the streets while their owners spent most of the day transacting their business. Those livery stables have now disappeared. The visitor to town drives in with his motor vehicle, chooses a convenient spot in the street somewhere in the centre of the City, and parks it there. Parking garages have

not taken the place of the livery stables except to a small degree, and the streets are now called upon to accommodate the accumulated vehicles of those who come to town.

At the census in 1911, the population of Mackay was little more than half what it is to-day, while that of the Pioneer Shire (which then included both Sarina and Mirani) was 9,700 as against 14,000 now for the combined shires. The roads were bad then, and it was an undertaking to drive even a few miles into town. Those who lived further out used the train for preference. Thus, the percentage of persons, apart from the numbers, visiting the town in vehicles, was much smaller than it is now. Even if they had all left their vehicles on the streets there would not have been enough of them to interfere with traffic, but the City is now reaching a size and the traffic such proportions that uncontrolled parking has already created a traffic problem.

The business centre of the City is small and concentrated, and it is to that centre that all persons coming to town for business must go. About the year 1897 the two main intersecting streets in this area (namely, Sydney and Victoria Streets) were planted with a central line of fig trees, which grew well and formed a splendid shade. As the use of motor vehicles increased, and in their case it was neither unsafe nor inhumane to leave them in the streets, the habit of parking vehicles along the centre line, in the shade of the trees, grew among the country people. There the women and children could sit and rest, and shopkeepers, having been informed of the position of the vehicles, could send parcels. The whole arrangement was ideal for a country town.

But Mackay grew from a country town into a city.

Streets are designed for the purpose of moving people and commodities from one point to another in the community, and any obstruction which an individual places in them, which is for his private good only, should give way for the good of the public as a whole. This must be accepted as a guiding principle in the control of standing vehicles. However, while streets are for traffic, and not for storage, it is clear that the stopping of a vehicle at the kerb for a reasonable length of time is actually a part of transportation, and cannot be prohibited except under unusual and special circumstances. It is thus clear that if vehicles are allowed to park in the middle of the street, that cannot take the place of allowing them to park at the kerb also,

even if for a limited time only. Thus a street where central parking is allowed in a shopping area must be wide enough to allow of kerbside parking also, on each side, while allowing for at least one clear and unobstructed line of traffic in each direction. The one lane left for traffic on each side must not be obstructed by vehicles moving into or out of the kerb when it is fairly filled with standing vehicles. Wherever there is merely a question as to the choice between kerbside and central parking, the former is the more desirable, for people must move across the moving lines of traffic to get to and from their vehicle when parked in the centre. When these persons are women and children from the country the danger is obvious.

In parking at the kerb in Mackay, without central parking, there is ample room in the streets for parking on an angle of 45 degrees. By this means more cars can be accommodated, and they can move in or out more easily. It has been found safest to drive straight into the kerb where such parking is used, because in moving out a driver can always watch and wait for his chance to back out when the traffic is clear.

In order to preserve streets for their proper use, progressive regulation of places and the length of time allowed for parking should be resorted to, always allowing as much latitude to the owners of motor vehicles as the density of the traffic will permit.

There is no reason why central parking should not be allowed in streets that are not busy shopping streets, and as the business area in Mackay is not a large one, it would not be a hardship if all day parking were confined to such streets and prohibited within the busy area.

Business people who object to parking regulations, must bear in mind that they themselves have helped to make them necessary. The practice of driving to work in one's car and then leaving it parked in the street can only result in hastening the necessity for traffic control.

The action of the Council in placing garden plots in the middle of the busy streets has caused a good deal of dissention. It is held that in Sydney Street, from Victoria Street to the bridge, they have resulted in a falling off of business, and in Wood Street, from Victoria Street to North Street, that they are a danger to traffic. The real protest seems to be not against the plots, but against the change from central to kerbside parking. As regards danger, it may be more dangerous for careless motorists when there is something in the centre of the

street than when there is nothing, but in the choice between a line of motor vehicles and garden plots, the former would certainly be a greater obstruction to the view, and in their irregular placing, would be more dangerous than the even line of a garden plot, which has the added advantage of not moving at an inopportune time.

The air photos obtained in connection with this Civic Survey were taken about 2.30 p.m. on Thursday, 13th April. The four ensuing days were holidays, and the City was preparing for the Easter Carnival. It is therefore reasonable to suggest that the shopping traffic was heavier than usual while the photos were being taken. Each vehicle is easily discernable in the streets, and a glance at one of the photos of the central part of the City is sufficient to show that there was no congestion of traffic anywhere.

When central parking was permitted, vehicles were not allowed to stay at the kerb. It is held by some people that those conditions enabled more of the country people to leave their vehicles an unlimited time in front of certain stores, that they then shopped at those stores, and that under present conditions they do not. That may be so, but kerbside parking enables more cars to stand in any section of street than central parking did. The difference, in the section of Sydney Street lying between Victoria and River Streets, is 60 with central parking, 70 with kerbside parking under present conditions, and 100 if the cars were parked diagonally at the kerbs.

It is considered that, now the break has been made and the parking regulations have been altered, it would be a retrograde step to remove the gardens and return to central parking. The garden plots in Sydney and Victoria Streets are not wide enough to be an obstruction to traffic, but those in Wood Street are wider, and it would be advisable to reduce their width to conform with those in the other streets.

The freedom of the flow of traffic is mostly regulated by the ease with which it can clear corners and intersections. In turning a corner, unless a motor vehicle can hug the kerb, it is forced to occupy a greater road space than if it were passing straight through. A study of motor traffic in England has led to the decision that the radius of the curve of a kerb at any corner should not be less than 30 feet.

The acute nature of corners in the busy sections of Mackay is a distinct disadvantage to traffic. They have been constructed so, on account of the peculiar drainage problem that confronts a city situated

in the tropics, and therefore subject at times to deluges, which are seldom, if ever, experienced in cities in more temperate climates. It has been cheaper to construct one large gully trap at the intersection of the two gutters, which become so deep as they approach the corners that they require to be bridged with concrete slabs in continuation of each footpath. The gully-trap at the corner is also covered in places with a concrete slab, and vehicles are prevented from passing over the gully-trap by placing a stout hard-wood post outside it as a protection. This method of construction will need to be altered in order to give better turning facilities for traffic in the near future. A separate gully-trap might be placed at the end of each gutter, before it intersects with the line of the footpath, and the edge of the footpath carried round the corner with a low kerb on a curve of suitable radius. However, the details of construction in obtaining the required result are better left to the City Engineer than detailed here. The most suitable curve is undoubtedly one with a radius of 30 feet, but with footpaths 10 feet wide, it is generally impossible to obtain a curve of this radius unless the building has been set back or rounded at the corner.

To further assist the clearance of traffic at intersections it is advisable that all properties at streets corners should be rounded, so that better vision is obtainable. The practice of truncating corners, which has been used lately, is not so effective, either from the point of view of traffic facility or in appearance. The most suitable minimum radius for a curve in such rounding is one of 50 links, laid out in three equal chords. This allows the width of the footpath to be maintained or increased slightly if required. In the built-up area of the City this can only be done as buildings are being altered or rebuilt, but if it is made the policy of the Council it can be completed at comparatively small expense over a number of years. Every opportunity should also be taken to effect such roundings throughout the occupied parts of the city area, and this can be assisted by declaring building lines to provide for it.

Another source of traffic congestion is the practice of allowing petrol pumps to be placed on the footpath. There is no justification for this practice. Filling stations generally occur in busy streets and they should be placed off the roadway upon private property, so that cars receiving attention do not obstruct the flow of traffic. The erection of petrol pumps on footpaths is a usurpation by private individuals of a part of the public highway, and should not be permitted.

Mackay is generally well provided with rear access to business places by means of lanes and rights of way. In all subdivision for business purposes it should be the policy of the Council to insist upon the provision of such access, so that the loading and unloading of commercial vehicles can be carried on within private premises and form no obstruction to traffic in the process.

Bicycles form such a large proportion of the traffic in Mackay that they should be given special facilities wherever it is possible, by constructing special tracks for them. If they were separated from other vehicular traffic, especially on arterial roads, it would give both added safety and greater facilities for all classes of traffic.

THE USE AND OCCUPATION SURVEY.

One of the first requirements of the town planner is a complete map of the city, upon which are shown all roads and subdivisions. It was found that such a map had been prepared for the Council in 1917. It is an accurate one, drawn on a scale of two chains to an inch, but does not show any bearings and distances. Only a few copies of plans of subdivisions shown on that map can be found in the Council's Plan Book. Since that date the plan records are complete. The City Engineer now keeps a map on a scale of eight chains to an inch charted up to date with the subdivisions made since the large plan was prepared.

For the purposes of a survey, field sheets were required, drawn on a scale not smaller than one chain to an inch. It was found that to prepare these sheets, complete with all subdivisions for the older part of the town which is laid out in regular sections, would have been too large an undertaking, so it was decided to draw them, showing the original government allotments only, and to fill in the subdivided frontages by measurements taken during the survey.

Nothing could have been of greater assistance in this work than an aerial survey of the City, and the advisability of obtaining it was pointed out at the commencement. However, it would have been too costly to bring a plane from the south specially equipped to take the photos, and the weather during January and February is so uncertain that few planes venture as far up the coast at that time of the year. It was decided to wait for an opportunity when a plane was in the locality. In the meantime the ground survey of the use and occupation of all properties was pushed on as fast as possible, with the never-failing aid of the City Engineer and his staff. The work commenced on 16th January at the centre of the City, working outwards, hoping always that the air photos could be obtained before the more scattered suburbs were reached. They can save most time where development is scattered, and practically every building is a residence. The survey was mostly carried out by Mr. Douglas Pheasant, who was specially suited for the work.

Eventually on 6th April the Council was able to obtain the services of Pilot Howard who was at Seaforth with his plane. Ald. Graham took a series of photographs flying at a height of about 3000 feet. The work was done under the greatest difficulty, as he had to hold his heavy camera over the side of the plane, standing up in the cockpit against

a wind of almost hurricane strength. It was impossible for him to change the plates quickly enough to obtain a running series of photographs, with the result that details were obtained of only scattered localities. On 13th April Pilot Howard was at the aerodrome with his plane, and it was decided to make another attempt to obtain the desired results. It was found that a smaller graflex camera owned by Mr. Douglas Pheasant would fit over a small opening in the bottom of the cockpit. Details were arranged with the assistance of Ald. Graham, and Mr. Pheasant went up with his camera to a height of 5000 feet, obtaining an excellent series of photos, covering the whole area. These photos were of a quarter plate size. They were developed and enlarged to a full plate size by Ald. Graham, when all the detail that was required was easily obtained from them.

The use and occupation map of the whole of the city area was completed on 21st April.

This map was by far the most costly and the most essential part of the civic survey. Without it no planning could be undertaken with certainty, while it forms the basis of all zoning proposals. Both the plan and the aerial survey should prove of inestimable value to the City Engineer in much of his work, apart from their value in preparing the plan of future development.

SURVEY OF VALUATIONS.

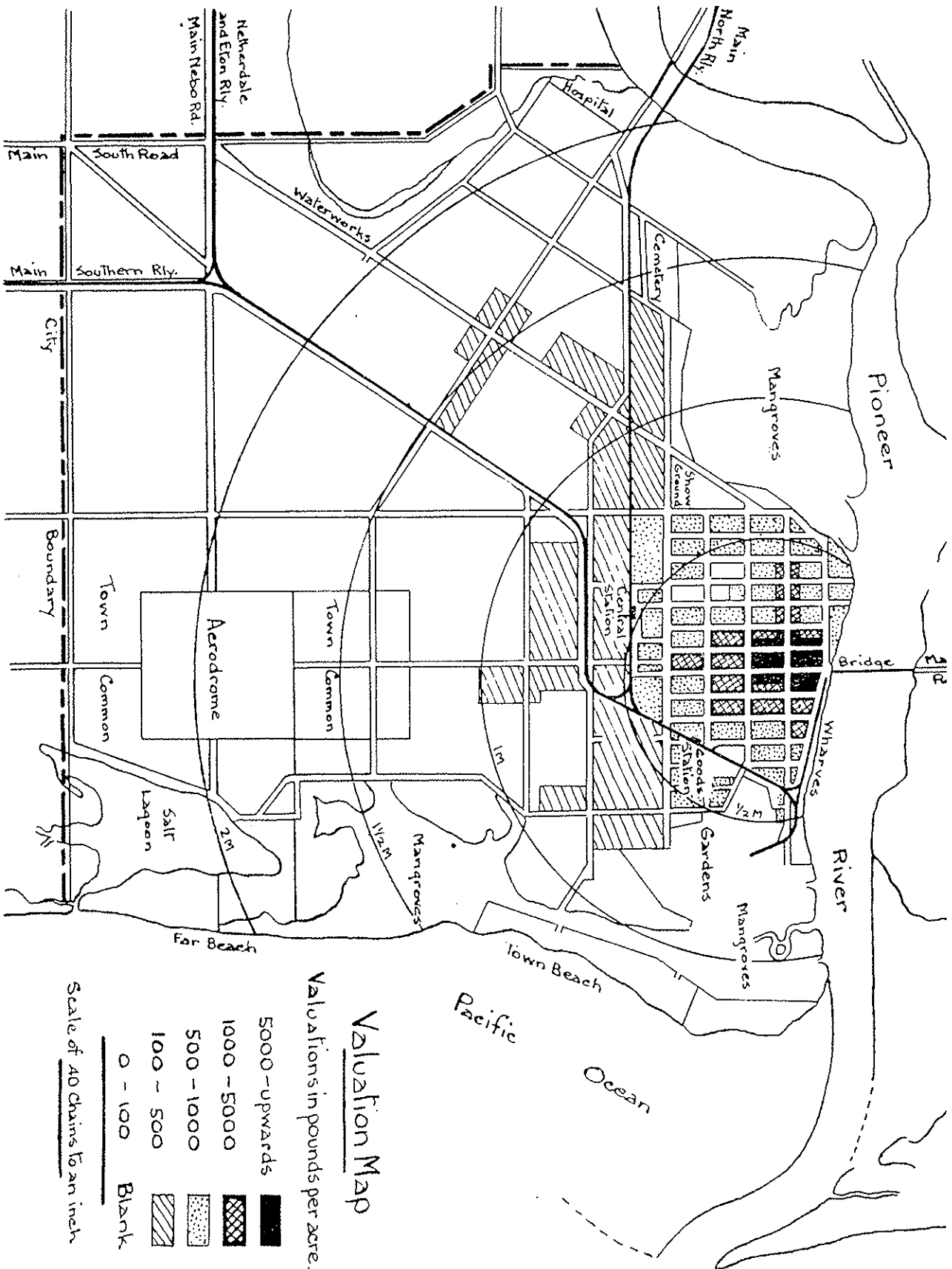
No proper plan of development, dealing as it does with street improvements and zoning, can be prepared without a knowledge of the relative values of the property affected. It is a difficult matter to obtain this knowledge from the values as they stand in the rate-book. The areas of the different properties must be taken into account, and all values reduced thereby to a common basis.

A list of the values was prepared from the rate-book, taking each section separately. The total for each section was then reduced to a valuation per acre. Where part of a section only was situated within the "First Class Area," those parts situated within and outside the area were taken separately.

This showed that valuations ranged from £7,600 per acre down to under £10 per acre. In order to present an idea of these relative values at a glance, a map was prepared, showing different colourings for different classes of value. The classes had to be divided unevenly, so as to spread the comparison to the lands of lower value on the outskirts of the City, the classification adopted being as follows:—

1. All lands valued at over £5000 per acre.
2. " " " " from £1000 to £5000.
3. " " " " £500 to £1000.
4. " " " " £100 to £500.
5. " " " " less than £100 per acre.

This plan should prove of considerable value to the Council in considering the preliminaries of any proposed civic development.



Analysis and Recommendations.

ROADS.

Few people will realise that in the part of Mackay, where the land is subdivided into regular sections, each containing an area of five acres, and separated by roads one and a half chains in width, one-third of the total area is taken up by roads. In other words, one-third of the area of the City, apart from the land occupied by schools, churches, and public buildings of all kinds, not only does not pay rates, but demands continual expenditure upon it. Surely one does not need more forceful proof of the need for the proper design and classification of roads so that the best use can be made of them for the least expenditure.

The manner in which the early road system of Mackay came into being is outlined in the early part of this report. Neither the Government nor the local authorities in our cities and towns seem to have visualised their growth beyond the areas originally laid out for them. Until recently there has been no attempt to guide the further development of the street system so as to continue those of the original town, and even since the evil results of such neglect have been realised little has been done to improve matters. The reason is plain. You would not think of trying to build a large building, a brick at a time, without a plan showing how each course should be laid to form the finished job. Yet our local authorities have been trying to do a much bigger thing without a plan. They have been trying to build the future city a subdivision at a time.

An efficient street system, classifying streets according to the traffic they should carry, cannot be obtained unless it is planned on a definite set of conditions, governed by regulations that will not permit drastic change. Where the future form of development of an area is determined it is possible to decide upon the type of road that will serve it. By avoiding mixed development, provision can be made to reduce the cost of construction and maintenance of roads required to serve purely residential localities. Thus the dependence of an economic street system upon zoning is apparent, and the recommendations that follow have only been made after the zoning of the city, which is dealt with later, had been decided upon.

The Local Authorities Act lays down the classification of streets, and fixes their minimum widths as follows, but provides that where a road now to be placed in a certain classification has been opened previous to the year 1924, to a lesser width than the minimum, it does not prevent its inclusion in that class.

Principal Roads .....	.....	minimum width 80ft.
Secondary Roads .....	.....	„ „ 66ft.
Residential Streets .....	.....	„ „ 66ft.
Lanes .....	.....	„ „ 22ft.
Pathways .....	.....	„ „ 12ft.

After the roads have been classified every new road must be classified before it is opened, and must have at least the minimum width of its classification.

The Act further requires the Council to keep a road map showing every road with its classification, whether it has been aligned, and whether its permanent levels have been fixed. It is important to note that an aligned road is one which has had its boundaries laid out, thus any dedicated road is an aligned road.

The Road Register, which is also required by the Act, is intended to contain the particulars regarding all roads shown on the plan, their classification, their width, levels, set back of building-line, and any other particular the Council may decide upon.

These particulars must be kept up to date and the map and register be open for inspection. Fees may be charged for certificates setting forth the information contained in the register. Such a certificate

or the road register may be produced in a court of law as proof of the classification, alignment, levels, or any other particular regarding any road.

The importance of the road map and register will be realised when once the Council has laid down classifications, widths, building-lines, re-alignments, etc., as recommended in this report, as the means of giving those particulars a legal standing.

The classification of a road depends more upon the functions it fulfils than upon its width and type of construction for the time being, or the volume of traffic using it.

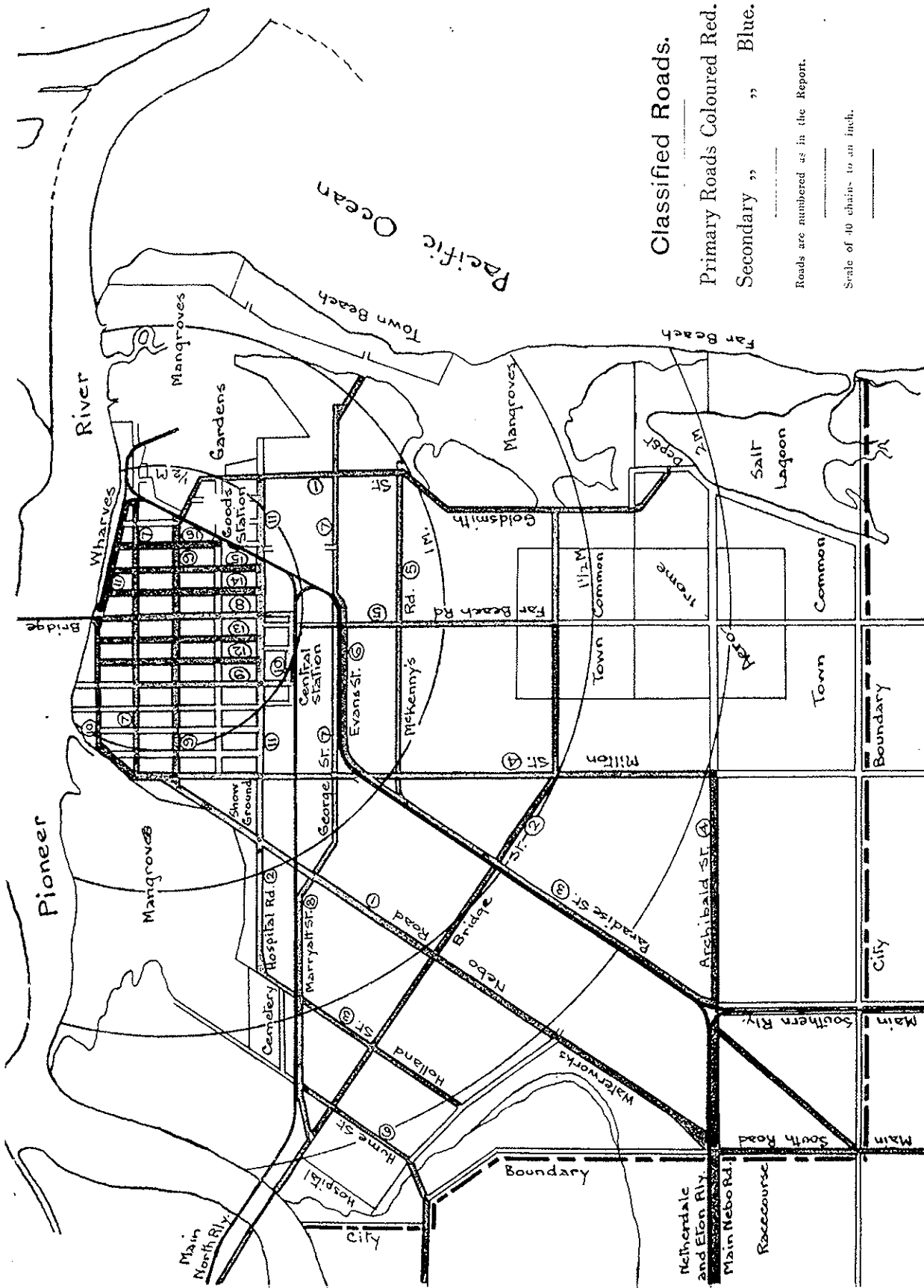
Principal Roads are those which serve to link up different localities with and within the main part of the city. The term "Main" Roads is not used, so as to avoid confusion with those roads under the control of the Commissioner for Main Roads. All such roads within the city area would naturally be included in this class, among others of a more local nature.

Secondary Roads are those acting as feeders to Principal Roads, or providing inter-communication between them, or within any defined area.

Residential Roads are those used primarily for originating traffic, such as vehicles belonging to abutting owners, or tradesmen's vehicles for the delivery and collection of goods. A better term would probably be "Third Class" Roads, but "Residential" is the term used in the Act.

Lanes are roads primarily for access to the back of premises. A Local Authority may prevent the erection of a dwelling-house to face any lane or pathway, under its By-law powers, but it must be known definitely to what roads the By-law applies.

Pathways are roads intended exclusively for foot-passengers, and such classes of vehicles drawn or propelled by them as the Council may prescribe. It is important to note that it is not legal for vehicles, other than those the Council may prescribe, to use pathways. The Act provides that pathways shall be used as outlets from blind roads.



Classified Roads.

Primary Roads Coloured Red.

Secondary " " Blue.

Roads are numbered as in the Report.

Scale of 40 chains to an inch.

PRINCIPAL ROADS.

1. *THE NEBO ROAD*, from the Caledonian Railway Crossing to Victoria Street. This has been gazetted as a Main Road, and is under the control of the Commissioner for Main Roads. It has a minimum width of 150 links throughout.

It connects the City with the racecourse, which lies just to the west of the city boundary. The Main Road from Sarina and the south, known as the Broadsound Road, joins that from Nebo, which collects all traffic from the Pioneer Valley, at the railway crossing. It is thus the most important artery leading to the country from the City.

The Caledonian Crossing passes over the local railway only. It is an open level crossing with a good unobstructed view of the railway, and has been greatly improved lately by constructing the road direct from it across the corner of the Lagoons Reserve. However, there is a danger to traffic approaching the City from Sarina, in the tall Guinea grass growing within the railway enclosure to the east of the crossing. It would be an improvement to widen the roadway across the rails on that side, and set back the railway fence.

The long triangular strip between the old and the new roadways at the Caledonian Hotel affords an excellent opportunity for planting large spreading shade trees. On the north-west side of the road, within the fence of the Lagoons Reserve, trees have already been planted. If those on the triangular strip are set the same distance back from the roadway as the trees already planted, a wide and pleasing effect should be given to this, the main entrance by road to the City. From the point where the old and the new roadways join going towards the City there is a long straight stretch to the corner of the Showgrounds, at Shakespeare Street. It is recommended that the tree-planting scheme be varied here, and each side of the roadway be lined with taller trees of more pointed growth. The Moreton Bay Ash is particularly recommended, as it is a local tree of the right shape, with a rapid growth. They should be planted so as to be clear of overhead wires, and should not be lopped during growth. There should not be any variation of the type of tree. This treatment will give a character to the main road entering the City, the long straight stretch lending itself particularly to an unbroken avenue, which will make it very impressive.

The too frequent junction of subdivisional roads with this road should be avoided, as it is a main artery for through traffic, which must

have as little interruption as possible. The future subdivision of lands adjoining it has been suggested on the plan in accordance with this.

This road has a slight grade, falling from the waterworks towards the Showgrounds. The slope of the neighbouring country is also towards the east. The drainage on the north-west side is collected in a drain which becomes larger as it approaches the Showgrounds and occupies a considerable proportion of the roadway. Every opportunity should be taken to divide the flow by passing it under the roadway, in order that the size of the drain may be reduced. This will the more easily be done as subdivisional roadways are opened at right angles to the main road. These roads will carry the storm-waters down to the railway line to the east, whence they will pass without damage across the area that is proposed to be zoned for farming and dairying, as the greater part of the storm-water does at present.

The part of this road from Shakespeare Street to Victoria Street has, during the greater part of its history, formed the main approach to the City, but lately, owing to the better surface of Shakespeare Street, it has not been much used. It is gratifying to know that steps are now being taken to complete the construction of the Nebo Road as far as Victoria Street. It will undoubtedly be found to immediately fulfil its old function again. The burden on Shakespeare Street will be greatly relieved, and the traffic will be divided between Victoria, Gordon, and Shakespeare Streets in the remainder of its journey to the City. Steps should be taken to give this traffic a safe and easy sweep into both Victoria and Gordon Streets. The former is classified herein as a principal road, and the corner of Milton Street, which is vacant at present, should be rounded with a curve of at least 150 links radius. This should be done during the construction of the Nebo Road. In any case the re-alignment of this corner to provide for the curve is included among those this report recommends.

Gordon Street is a secondary road, and will probably carry a good deal of the traffic, particularly if its construction is suitably joined up, past the northern end of the Showgrounds, with that of the main road, and the Showgrounds' fence set back in a curve at the corner.

A fourth branch from this artery towards the City exists and should be suitably constructed as opportunity permits. It is the approach to the bridge via Mangrove Road and North Street, forming a by-pass from the busy part of the City for traffic desiring to pass direct via the bridge to the North Side.

The Nebo Road crosses the Northern Railway before reaching Shakespeare Street by means of an open level crossing. This should be supplied with an efficient warning device, as an incoming rail motor would be screened from incoming road traffic by some houses. There has already been evidence that this is a dangerous crossing.

2. *THE HOSPITAL ROAD*, consisting of Shakespeare Street westwards of the Showgrounds, Holland Street, and either Cemetery Road and Hume Street, or a new road as detailed herein, to Bridge Road, and by that road to the Pioneer Bridge.

This road connects the City with the District General Hospital, and via the Pioneer Bridge with the farming district lying between the north bank of the River and Farleigh. Via Hume Street, it also connects with the district lying westwards of the city boundary on the south side of the River.

It is of varying widths at present. Shakespeare Street is 150 links wide, until, upon approaching the cemetery, there is a widening on its southern side. Private property, now mostly subdivided, abuts upon this side, but on the north is a reserve. Within the boundary of the reserve a line of trees has been planted parallel with the road. This part of the road would be greatly improved by planting each side in addition to the trees in the reserve.

At the cemetery gates the road turns into Holland Street, one chain in width, running south-west and thence round the corner of the cemetery into Cemetery Road running west. Thence it turns into Hume Street, running south-west again, and crossing the northern railway line, turns again at right angles, towards the north-west, into Bridge Road. The number of turns in this road, although not acute ones, have militated against its use as a main traffic artery, in spite of its good surface. Since a good gravel surface was put down in Bridge Road, between Hume Street and Nebo Road, a great proportion of the traffic has preferred to use it, turning into the Nebo Road, and thence to the City. Although that surface is an excellent one for a secondary road, which Bridge Road really is, it will soon be ruined or require to be surfaced with bitumen unless the traffic can be induced to use the Hospital Road. The right-angled turn from Hume Street into Bridge Road is another disadvantage, making a rather dangerous intersection.

It is recommended that this road be improved in the following

manner. The turn at the cemetery gates should be flattened by rounding back the alignment. It is unfortunately occupied by monumental works at present. There is a vacant allotment adjoining them to which they might be able to extend if necessary on rounding the corner.

After turning into Holland Street, the road should be continued until it crosses the railway. A road, at least 125 links wide, should then be opened along the southern side of the railway to connect with Hume Street. It traverses cultivation fields only, and should not cost anything for resumption, as it greatly improves the prospective value of the property it passes through, giving an excellent new frontage for future subdivision. If it is not put through under this proposal the owners will be called upon to construct it themselves as well as dedicate it, whenever the land is subdivided.

The new road should then cross Hume Street, and after continuing along the railway for about three chains, turn south-westward to join Bridge Road, about ten chains north-westward of Hume Street, avoiding the residences fronting Bridge Road. This section does not improve the value of the land to so great an extent as that between Holland and Hume Streets, and as it cuts across a cane paddock, compensation would probably have to be paid for its resumption.

In order to avoid leaving a bottle-neck, Holland Street should be widened to 125 links by the addition of 25 links on its western side.

The advantages of the deviation are evident. The railway crossing at Holland Street will increase in importance in any case (see Secondary Road No. 3) and by using it, the Hume Street crossing becomes of little importance and need only be maintained as third class.

3. *PARADISE STREET*, from Milton Street to Archibald Street, and thence by a new road to the Broadsound Road. Paradise Street is unimportant at present, serving merely as access to a few farms. However, it runs parallel to the Nebo Road, which it can be made to assist, giving direct access to the southern part of the City for traffic from the south and west, as the Nebo Road does to the centre and north of the City.

All traffic approaching from Sarina and the south enters the city area where the Broadsound Road crosses Boundary Road, then

passes up the west boundary to the Caledonian Crossing where it joins the Nebo Road, with all the traffic from the west. If the southern traffic is bound for the southern or eastern parts of the City, it must take a circuitous route by the Nebo Road.

In the south-western corner of the city area there is a square of farming land bounded by the Broadsound Road, Boundary Road, Collins Street (beside which runs the main southern railway) and Archibald Street. It is recommended that a new road, 125 links in width, be opened diagonally across this area, connecting the intersection of the Broadsound and Boundary Roads with Archibald Street near Paget Junction. There is a house in the latter corner of the square, which it would not be necessary to interfere with. The new road joins Archibald Street just to the west of the house. Thence the traffic would cross the southern railway by Archibald Street, and proceed up Paradise Street, along the south-eastern side of the railway until it reaches Milton Street.

Paradise Street is only one chain wide, but that is sufficient, as it joins the railway along its whole length, and no footpath is required on that side. If the new road were opened now, and a good surface constructed throughout, a considerable amount of traffic would immediately use the road, but the most urgent requirement is to obtain the new road while there is no obstruction to it.

4. *MILTON STREET.* From the Nebo Road to Archibald Street. This street connects with the City the area which is now farming land, but which has been zoned for isolated trades.

At its northern end it is one of the streets in the original part of the City and is 150 links wide. Its construction should join that of the Nebo Road just south of Victoria Street. Thence, going south, it passes the Showgrounds to Shakespeare Street. Southward of this point it narrows to a width of one chain, the eastern side not being in the same alignment. This narrowing has made the intersection a dangerous one. From Shakespeare Street southwards to the southern railway, Milton Street passes through a thickly-settled residential quarter, but from the railway onwards it traverses open fields, with only a few residences until it reaches Archibald Street, which is two chains wide, being a continuation of the Nebo Road.

It is recommended that Milton Street be widened to a width of one chain and a half, from Shakespeare Street to Archibald Street, by taking a strip half a chain wide on the eastern side. This entails rather heavy resumption costs on the section from Shakespeare Street to the railway, and, if the strip had to be resumed at once, and the houses moved back, it might prove so expensive as to be unattainable. It is therefore recommended that the provisions of Section 83A (2) of the Local Authorities' Acts (Amendment Act) of 1923 be applied, and a re-alignment of this part of the street be declared. The remainder of the widening could be dealt with either by resumption or re-alignment. Its re-alignment is included in those proposed for declaration. It must be remembered that although present requirements do not necessitate the widening of the southern portion, provision should be made for the future, and the cost is small.

5. *THE FAR BEACH ROAD*, comprising Juliet Street from Boddington Street to Bridge Road, Bridge Road eastwards to Goldsmith Street, Goldsmith Street southwards to the Town Common, and thence through the Common to the Sanitary Depot and the Far Beach.

This road connects the City with the aerodrome, the Sanitary Depot and the bathing beach. It is only on chain wide throughout, but as it passes, for the most part, through the area zoned for farming and dairying only, it is not suggested that it should be widened. It will be considerably relieved when the formation of Goldsmith Street is completed. (See Secondary Roads 1.)

Immediately after leaving Boddington Street, Juliet Street crosses the main railway, and, a short distance further on, there is another crossing. Both these crossings should have better warning devices, for the road carries a considerable amount of traffic, and buildings obstruct the view in many directions.

The right-angled bends in this road, on entering and leaving Bridge Road, will require rounding. There is no resumption necessary at Juliet Street, but at Goldsmith Street the corner of the private property should be rounded well back while it is still unbuilt upon.

6. *HUMF STREET*, from the Landsdowne Road at the west boundary of the City to Bridge Road, or, when the proposed new part of the Hospital Road (see No. 2) is constructed, to that road.

This road connects the City with an area which is devoted entirely to farming at present, and will probably remain so for a number of years, but it is an area which is suitable for future residential development, and provision should be made for this road to serve a greater purpose than it does. It is one chain wide at present, but it should be widened to at least 125 links on its south-eastern side. This side is chosen and a re-alignment proposed from the new Hospital Road to the Lagoons Reserve, because it includes the Pound Reserve, where no resumption is required. After crossing the Lagoons Reserve, there is a short section of privately-owned land on its southern side, with the reserve still on the north. Here the widening can be made on the other side, within the reserve.

7. *VICTORIA STREET*, from the Nebo Road to Goldsmith Street. This is a direct road connecting both the western extremity of the City with the Nebo Road, and the heavy industrial area on both railway and river at the eastern extremity of the City, with the centre. It is 150 links wide throughout, being one of the streets in the original plan, and is the main street of the City, running in an east-west direction. The only planning improvement recommended is the rounding of corners, particularly that at the western end, where it joins the Nebo Road. (See Road No. 1.)

It was planted with a central row of trees from Macalister Street to Carlyle Street about 1897, but all but seven of these have been removed. The remaining trees are mostly well-grown, giving a splendid shade, and should be preserved as long as possible. The place of the others has been taken by garden plots, which give it beauty and distinction. The plots are well spaced, giving ample circulation space for traffic.

8. *SYDNEY STREET*, from the bridge to the main railway. This connects the main approach to the City from the north, via Sydney Street Bridge, with the centre of the City, and continues southwards to form the main approach to the Central Railway Station, when the proposals contained herein regarding Boddington Street have been given effect to.

From the bridge to Shakespeare Street it is one of the streets on the original plan, and is 150 links wide, but the continuation to the railway from Shakespeare Street is a subdivisional road which is one chain wide. The contraction in width is made by practically an equal

amount on each side, so that there is no dangerous distortion made in the direction of traffic in entering it as with Milton Street, and it is not considered necessary to widen it.

The corners of intersecting streets should be rounded in Sydney Street as in Victoria Street.

Sydney Street was planted with a central line of trees at the same time as Victoria Street, but with two exceptions they have been removed from the bridge to Gordon Street. From Gordon Street to Alfred Street the trees remain. They are, unfortunately, not nearly so suitable a type of tree for road-planting as those in Victoria Street, having stronger roots and less foliage. The place of those that have disappeared has been taken by garden plots, as in Victoria Street.

9. *MACALISTER STREET.* From Victoria Street to Boddington Street.

With this street produced from Shakespeare Street to Boddington Street, a direct connection between the Central Railway Station and the City is provided. This street is part of the scheme for improving access to the station, and the improvements recommended here should be read in conjunction with those under Primary Roads Nos. 8 and 10.

Macalister Street is one of those in the original plan, and extends from the River southwards to Shakespeare Street, with a width of 150 links. Almost directly in continuation of it is the station, with which the only connection is a footpath 25 links wide.

The placing of this station, which was only opened to traffic in 1921, is one of the most regrettable errors of planning in the City of Mackay. It is a good building, and could have been placed so as to form an architectural feature of the City, and have been provided with perfect means of access with a comparatively slight increase of expenditure by the Government at the time. Its environs are now thickly settled, and the access must be improved at a much greater cost, by the City Council, while it is only possible to make the best of a bad job, as the station is wrongly sited.

The Government resumed, and dedicated for road purposes, an ample open space in front of the station, but placed it at one end of the space, which is thereby robbed of most of its utility and impressiveness. The land was resumed right through to Shakespeare Street, but not one of the straight wide streets of the City was continued to provide direct access. The result is that there are "s" turns on both approaching and leaving the station, and it has been necessary, in an attempt to minimise the danger of them to traffic, to declare one-way traffic, entering Boddington Street by either Juliet or Romeo Streets, and leaving it by either Sophia or James Streets. Juliet and James Streets have been specially constructed to carry this traffic, and therefore most of it follows that route.

Almost directly in front of one, standing on the steps of the station, and taking one's first view of the City, is a narrow footpath, backing onto which, and extending to within about a chain of the station is a row of repellant back-yards. The back-yards as such are well kept, but a back-yard, like an industry, becomes noxious when it is wrongly placed, and a row of galvanised iron outhouses is not the first sight for a visitor to have of a City.

How far the responsibility for the errors in planning rests with the Government, and how far with the City Council, is now difficult to determine.

It is recommended that Macalister Street be continued through with a width of 150 links, from Shakespeare Street to Boddington Street. That will result in taking 75 links from the backs of the properties fronting Sophia Street, and eliminating one of the houses fronting Shakespeare Street. There are seven houses fronting Sophia Street and they should be turned round on their existing stumps to face Macalister Street. Sophia Street is 75 links wide. If it is closed and the space now occupied by it added to the allotments that have lost 75 links to the new street, their area will not be affected. Two of the houses lying between Sophia and James Streets, unfortunately, front Sophia Street, and they also would require to be turned.

The effect would be to improve the value of all James Street frontages by eliminating back-yards, to rid the Council of the upkeep of an unnecessary street, to greatly improve the value of the properties that would front the new street, and to remove an eye-sore from one of the main gateways to the City.

Watson's Lane would become absorbed in the new road, and a strip of 50 links be required from the sides of the three allotments to the east of it. This will, unfortunately, necessitate moving over all three houses and the small shop facing the station. It may be thought sufficient to leave the new road one chain wide and not to touch the allotments on the east, but if that is done the same situation will be created that exists now at Milton Street, which is recognised as one of the most dangerous intersections in the City. Furthermore, the character of railway station traffic necessitates a better exit than entrance. Its coming to the station is spread over a period of time, but upon the arrival or departure of a train it departs almost "en masse."

10. *BODDINGTON STREET*. From Macalister Street to Sydney Street.

The function of this primary road is obvious, connecting as it does the entrance to and the exit from the station.

At present this street does not cross Juliet Street. Its northern alignment to the west of Juliet Street should be produced eastwards to meet Sydney Street. There is a narrow laneway connecting the end of Sydney Street, along the railway fence, with Juliet Street, but, if the traffic is to be drawn along Sydney Street, and so avoid the dangerous corners leading into Juliet Street, met with on its present route, the connection to Boddington Street must be direct and clear.

The corner that will be formed by the turn from Sydney Street into Boddington Street should be rounded by a curve with a radius of at least one chain.

11. *SHAKESPEARE STREET*, from the Nebo Road to Goldsmith Street.

This street acts as a connection across the City, from the east to the west, avoiding the main centre of the City, and as a main distributor for the traffic from the station. It is 125 links wide, and carries an important main drain, which collects storm-water from as far west as Nelson Street and empties it onto the reserve at its eastern extremity. It is one of the busiest traffic arteries at present, taking

practically all the Nebo Road traffic, and distributing it throughout the City. It will, however, be greatly relieved when the construction of the Nebo Road is completed to Victoria Street.

The corners of all streets branching from it should be rounded as opportunity occurs. The Showgrounds' corner at Milton Street has been truncated, but it is not cut back sufficiently, and the roadway and drains have not yet been made to conform to it. This is a bad corner at present, but it will be greatly relieved by the Nebo Road and by widening Milton Street to the southwards. (See Road No. 4.)

Towards its eastern end, Shakespeare Street crosses the goods railway, and traffic is frequently held up by shunting goods trains. It is absolutely essential that this crossing be kept open, and not allowed to follow the fate of the Alfred Street crossing, which has been closed by the Railway Department on account of its goods traffic.

SECONDARY ROADS.

1. *GOLDSMITH STREET*, from Gordon Street to Bridge Road.

This forms part of an outer "ring" road in conjunction with Bridge Road, which will greatly assist in distributing traffic when its formation is completed.

Commencing at the Gardens it is a continuation of Gordon Street southwards, and is 150 links wide as far as Shakespeare Street, where it narrows to one chain. This width is continued to Bridge Road. No recommendation is made regarding widening, but the corner south of Shakespeare Street, where the narrowing occurs, should be rounded by a curve of at least one chain radius. The road is formed as far south as McKenny's Road, but is bad and at times impassable from there to Bridge Road. If the road surface throughout were well constructed this road would relieve Juliet Street of a large proportion of the bathing beach traffic.

2. *BRIDGE STREET*, from Juliet Street to the new Hospital Road.

This continues the encircling of outer localities. It is one chain wide throughout. Across the Common, between Juliet and Milton Streets, there is no formation. If this section were formed it would immediately take some traffic, as may be seen from the air photos. This would undoubtedly increase, and a shorter connection would be made to the Sanitary Depot from out-lying parts of the City. The city streets would also be relieved of some of the bathing beach traffic.

From Milton Street to the Nebo Road practically no formation has been done, but from there onward the gravel surface is excellent and takes a good deal of traffic.

This encircling road will become increasingly valuable as a traffic distributor.

3. *HOLLAND STREET*, from the Hospital Road to Lagoon Street.

Thirty years ago one of the finest residential frontages in Mackay was that to the Lagoons Reserve, lying between the Nebo Road and Hume Street. The long green slope of the banks, closely cropped by stock, ending in the large lagoons, untouched by hyacinth, and covered with wild-fowl, made the reserve very attractive.

The fine old homes have gone, their position only marked now by some patriarchal mango trees, the sloping banks of the reserve are hidden with cane, and the wild-fowl, with the exception of coots, no longer visit the hyacinth-infested lagoons. This is one of the greatest surprises awaiting an old resident revisiting the spot.

The special leases to grow sugar-cane on the reserve are falling in, and the Council has talked of developing the reserve as a park. If this were done there can be little doubt that the frontage would soon become valuable again. It should do so even if the reserve were cleaned up, the hyacinth cleared, and the grass kept down by stock. There can be little doubt in any case that this locality will again become a first class residential one in time, and Holland Street should therefore be classed as a secondary road, even though no alteration may be required in its construction at present. Its width of one chain is sufficient to fulfil its function.

4. *ARCHIBALD STREET.* From the Nebo Road at the Caledonian Crossing to Milton Street.

This street is two chains wide, being a continuation of the Nebo Road easterly. It is a cross connection passing along the northern boundary of the area proposed to be zoned for isolated trades. It is unimportant at present, but will become so should that area ever develop. It is in any case a necessary connection.

5. *McKENNY'S ROAD,* from Paradise Street to Goldsmith Street.

This is a subdivisional road, one chain wide, providing a necessary cross connection to the east when Paradise Street has been completed. (See Primary Road No. 3.) At present a surveyed road, not constructed, is shown on the plans, leaving Paradise Street and following the route of the railway deviation which was surveyed but never used. It goes as far as Milton Street, but does not connect up with any other road, and serves no useful purpose. This road should be closed and another opened to the north of it, so as to connect McKenny's Road, where it joins Milton Street, with Paradise Street.

From Milton Street to Juliet Street, McKenny's Road was dedicated in an old subdivision, but has not been used, though it appears to have been formed many years ago. From Juliet Street to

Goldsmith Street this road has been continued in a later subdivision, and some formation work has been done on it. It is just trafficable at present, and is little used.

This road is only of value as part of the comprehensive road system, but its connection to Paradise Street should be secured while the land is unoccupied. There should be no resumption cost, as it would be in exchange for the road already surveyed.

6. *EVANS STREET*, from Milton Street to Juliet Street.

This is another road that will distribute traffic brought to the southern part of the City by Paradise Street, of which it is a natural continuation. It is of varying widths at present, and should be widened to one chain throughout. For this purpose its re-alignment is included among those recommended herein.

The railway, which it follows, has rendered this street necessary. It runs parallel to George Street, with only the railway between. They are of equal importance as secondary roads, and each has its own function to perform.

7. *GEORGE STREET*, from the Nebo Road to Juliet Street, thence across the railway southwards by that street, easterly by the continuation of Evans Street to George Street, thence easterly by that Street to Beach Road, and by that road to the Town Beach.

This road is one chain wide throughout. It is an important east-west connection and is used a great deal at present. It has a good surface, the construction of the section from Milton Street to the Nebo Road having just been completed. Its continuity to the east of Juliet Street has been broken by the railway, which necessitated the crossing by Juliet Street.

The corners where this street joins the Nebo Road should both be rounded well back to maintain good vision and an easy turn for traffic entering and leaving the main stream.

8. *MARRYATT STREET*. Westwards from Nebo Road, and continued by a new road along the railway to Holland Street. This forms a connection on the south of the railway between the new Hospital Road and George Street.

Marryatt Street is not quite in continuation of George Street, but as that important artery, the Nebo Road, intervenes, the offset does not detract much from the value of the connection. Traffic crossing from one street to the other will have to give preference to the main road traffic, and the break in the straight run will probably assist in this.

Marryatt Street should be continued westerly along the railway by a new road, one chain wide, as far as Holland Street. This will eventually necessitate moving a house fronting Holland Street. As there is not room to move the house further along Holland Street without obtaining some of the adjoining property, it could be moved back and fronted to the new road.

This road is not an immediate necessity, but after the new Hospital Road has been completed, it will be a necessary link in the road system.

9. *GORDON STREET*, from the Nebo Road to Goldsmith Street.

This is an important connecting road from east to west across the City, skirting the business quarter. It is 150 links wide throughout. The corners of intersecting streets should be rounded. The railway crossing at its eastern end will increase in importance, especially with the completion of Goldsmith Street.

10. *MANGROVE ROAD AND NORTH STREET*, from the Nebo Road to Sydney Street.

This road forms a northern by-pass, avoiding the busier quarter of the City, for traffic between the north side and the south or west, that has no business to transact in the City. Its construction will help to distribute traffic after the Nebo Road has been completed.

This was the original continuation of the Nebo Road to the town, and carried traffic before Victoria Street did. It will come into considerable use as soon as the construction of a good surface is completed.

11. *RIVER STREET*, from Sydney Street to Victoria Street at Byron Street.

This road, besides providing access to the wharves, serves as a by-pass from the bridge to the east of the City. It also connects several warehouses with the railway goods station via Tennyson Street.

Although the railway to the wharves passes along it on the River side, there is ample width for traffic. It is essentially an industrial street. If the proposed harbour is built it will probably be crossed twice by the harbour railway, at Brisbane Street and near the power house. This, however, will not reduce its value very much, particularly as it will be relieved of the wharves traffic.

The acute corners of sections on the east side of the connecting roads should be rounded.

12. *GREGORY STREET*, from Shakespeare Street to North Street, is a north and south connection on the western edge of the main business area.

13. *WOOD STREET*, from Shakespeare Street to North Street, is one of the busiest streets in the City, having grown greatly in importance as a business street of late years.

The corners of all intersecting streets should be rounded.

14. *BRISBANE STREET*, from Shakespeare Street to River Street, is the north-south connection on the eastern edge of the main business area.

15. *CARLYLE STREET*, from Shakespeare Street to River Street, is a north-south connection in a light industrial area that will grow in importance.

16. *TENNYSON STREET*, from Alfred Street to River Street, is the connection from the warehouse and wharf area to the goods station. The corner on River Street should be rounded to make this route more attractive than others to the heavy traffic.

RESIDENTIAL AND OTHER STREETS.

All other streets are classified as third class, being residential streets, lanes, or pathways. Not being traffic streets, or streets necessary in the circulation of traffic, their construction can be of a lighter type, sufficient for the traffic that originates in them.

LANES.

The Council already has a by-law (No. 96) relating to buildings facing lanes, but as certain streets were opened before there was any classification applying a minimum width, and as some of the streets were not opened as giving access primarily to the rear of premises, it is important to classify the streets to which this by-law applies.

It is therefore recommended that the following roads be classified as lanes:—

1. *VINCENT STREET*. This street is 50 links wide, and was opened in an old subdivision of Portion 127. There are three houses fronting it at present, and a water main has been laid to serve them. They should be turned to face Kenilworth Street when they are rebuilt, and the upkeep of Vincent Street be reduced to a minimum.

2. *TAY STREET* is similar to Vincent Street. Unfortunately, more houses have been built to face it, and gas, water, and electric light mains have been laid in it. On the western side there are five houses which should be turned to face Kenilworth Street if the opportunity occurs. On the eastern side there are two houses, which should be turned to face Forth Street. Luckily in the southern part of the street there are no houses fronting it. No more should be allowed to do so, and even if certain resumptions are necessary, it would probably be advantageous for the Council to make them so that this street could be relegated to its true function.

3. *HAYE'S LANE*, connecting the end of Turner Street with Prospect Street, is 22 feet wide. This was apparently opened by the Government in the subdivision of Workers' Homes fronting Turner Street. Unfortunately, two Workers' Homes already front this lane, which is their only access. Within the settlement Haye's Lane was therefore opened by the Government as a residential street. No further

houses should be allowed to front it, and the deplorable example set by the Government in this instance should not be followed by the Council.

The possibility of widening this lane is suggested among "Other Street Improvements," (No. 10).

4. *A LANE* off South Sydney Street, within the loop of the railway. It is 25 links wide.

5. *A LANE* lying midway between Sydney Street and Keats Street. This is 25 links wide.

6. *A LANE* in Section 57, running from Byron Street to Goldsmith Street. About 25 links wide.

7. *A LANE* in Section 42, from Carlyle Street to Tennyson Street. Width about 12 feet.

8. *A LANE* in Section 33, providing access to the Court House from Victoria Street. Width about 20 links.

9. *A LANE* in Section 24, providing secondary access to the business premises fronting Victoria Street. Width about 12 feet.

10. *A LANE* in Section 19, similar to No. 9.

11. *A LANE* in Section 23, off North Street, giving access to the rear of the Pioneer Shire Council Office. Width about 35 links.

Many of these lanes are less than the minimum width laid down by the 1923 Amendment Act, but it is believed they were all laid out prior to 1924 and can therefore be classified as lanes.

It must be noted that no road with a width of less than 22 feet, opened since January, 1924, can be classified as a lane, nor is it legally capable of bearing vehicular traffic.

PATHWAYS.

All those roads dedicated since January 1st, 1924, which have a width of less than 22 feet, are classified as pathways and can only be used by pedestrians or by vehicles drawn or propelled by pedestrians. The minimum width is 12 feet.

A number of roads have been permitted by the Council and accepted for dedication by the Titles Office since 1924 within the city area, with a width of 11 feet only. Their acceptance was illegal, and the safest action for the Council now is to classify them all as pathways, as accidents are then not so likely to occur in them.

If the Council had wished to have half a laneway dedicated, the correct procedure would have been to have the land therein transferred to the Council, to hold it until the other half was surveyed, and then to dedicate the full width. Many of the other halves of those laneways may never be dedicated.

It is recommended that all roads dedicated since January 1st, 1924, having a less width than 12 feet be closed, and deeds obtained for them by the Council.

OTHER STREET IMPROVEMENTS.

1. *MILNE LANE*, from Nebo Road to Holland Street, through Portions 36 and 53.

This road is at present 50 links wide and thirty chains long. It is a subdivisional road opened through portions that were five chains wide. The allotments fronting it on the south-west are two and a half chains deep, while the land remaining on the north-east is two chains deep. Although the land on the latter side is not yet subdivided into allotments it probably will be subdivided later, and the depth of two chains should not be reduced.

The road should be widened to one chain by taking 50 links from the allotments on the south-west side. There are several small houses on this side, but it would not be an expensive matter to move them back at any time, if necessary to effect the widening.

It is recommended that a re-alignment of this road be declared, effecting the widening as suggested, and that the necessary resumptions be made as opportunity offers.

2. *MARY STREET*, from the Nebo Road to Dodson Lane through Portions 8 and 81.

This road is 50 links wide, being centrally placed in portions that were five chains wide, so the allotments on each side are 225 links in depth. The portions front Bridge Road on the south-west. Thus the depth between Bridge Road and Mary Street is 225 links. This should not be reduced, as it would just be possible to re-subdivide so as to have frontages to both streets, and avoid the waste of having one row of allotments lying between two streets.

However, the allotments on the north-east side would not suffer appreciably by being reduced in depth by 25 links, whereas the road would be greatly improved.

It is therefore recommended that Mary Street be widened thus to give it a width of 75 links, and that a re-alignment be declared accordingly.

3. *DODSON LANE*, from the north boundary of Portion 79 to its junction with Milton Street.

This road is only 50 links wide, and it should be widened on its north-western side by the addition of 50 links to be dedicated from the land fronting it. The street should also be produced south-westwards along the railway as the portions are subdivided.

Most of the land fronting Dodson Lane has not yet been subdivided. It should be sufficient to declare a re-alignment, but to take no action to resume, as the widening of the road can be made a condition of subdivision when it takes place.

In Portion 81 at the end of Mary Street and fronting it are two allotments with a frontage of 50 links. The re-alignment therefore covers the whole of these allotments, and, if they are held separately, it would be necessary to resume them. It seems, however, that in each case they are part of the adjoining property, and not built upon. In any case, their resumption now should be a small matter and might be advisable.

Unfortunately, a subdivision of Portion 89 has lately been allowed without widening Dodson Lane. It would be advisable to make arrangements regarding widening there as soon as possible, before the allotments become saleable, especially as the last allotment fronts the

subdivisional road—Taylor Street. This allotment is one chain wide, so it will be necessary for the balance of it to be amalgamated with the next allotment.

This street bears practically no traffic at present, but will be used a good deal as the land fronting it is subdivided.

4. *GIBSON AND FORD STREETS*, off Shakespeare Street West.

These streets are each 50 links wide, being subdivisional streets in an old subdivision. They are not important, as they are not likely to be extended, but they are very narrow, and could each be widened to 75 links without spoiling the allotments fronting them.

It is recommended that Gibson Street be widened by 25 links on its south-eastern side from the boundary of Portion 48 to the bend. From this bend to Shakespeare Street, the widening should come from the west side, so as to avoid a house that is close to its eastern alignment.

Ford Street should be widened by 25 links on its north-west side, from Portion 48 to Shakespeare Street. This will necessitate moving the house fronting Shakespeare Street, on that side, but will still leave ample frontage to the allotment.

The reason for not taking the land between the streets for widening is that it has a depth of 250 links, which will be sufficient for eventual subdivision fronting each street, and would be spoiled for this purpose if some of its depth were taken.

Ford and Gibson Streets should be joined at their blind ends by a connection at least 22 feet wide. This should be taken from the land in Portion 48, as the end allotment fronting these streets would be spoiled if the connection were taken from it.

Re-alignments should be declared in accordance with these recommendations.

5. *ROMEO STREET*, from George Street to Hamlet Street.

This street, being only 50 links wide, is too narrow to provide the only access to a row of houses on each side, nine chains in length. It is a legacy from a very old subdivision before the Undue Subdivision of Land Prevention Act of 1885. As nine chains is its total length and it can never be extended, a width of 75 links would be sufficient.

It should be widened on the east side by taking 25 links from the allotments, which are 250 links in depth, and all front this street. If it were widened on the west side one of the allotments which fronts George Street would be eliminated. The widening on the east side does not detract from the final value of the allotments at all.

A re-alignment should be made in accordance with this recommendation, and notices served at once upon the frontagers concerned.

6. *OTHELLO STREET*, from George Street to Hamlet Street. This street is similar to Romeo Street in width, length, and history.

It is recommended that the street be widened by 25 links on the eastern side, where the corner allotment fronting George Street is luckily clear, and the balance of it will remain with the owner, who owns and has a house on the adjoining allotment.

There would be less owners concerned if this street were widened on the western side, but the allotments fronting both George Street and the south side of Baxter Street would be ruined. The value of the allotments on the east of the street will not be reduced, as they are 225 links in depth. A re-alignment should be declared at once in accordance with the recommendation.

7. *WATSON'S LANE AND SOPHIA STREET*, from George Street to Hamlet Street.

Watson's Lane is 25 links wide, and Sophia Street 75 links wide. Between them is a single row of allotments two chains in depth, all of the houses fronting Sophia Street. Between Sophia and James Streets is another single row of allotments, on which the houses all front James Street. It is obvious that this section would be greatly improved by widening Watson's Lane on its western side, turning the houses now fronting Sophia Street to front it, and closing Sophia

Street, adding the land contained in it to the allotments that have lost land to widen Watson's Lane. But the allotments in this section were surveyed with a width of only 50 links, and several of the houses stand upon single allotments of that width. If these houses are deprived of all back entrance their value is greatly reduced. Watson's Lane need only be widened to 75 links to be in conformity with the widened Romeo and Othello Streets.

It is therefore recommended that Sophia Street be narrowed by 50 links to be taken from its eastern side, leaving a lane 25 links wide, to provide rear access, and that Watson's Lane be widened by 50 links on its western side. Sophia Street then to be classified as a lane, and the houses fronting it turned to face Watson's Lane.

A re-alignment of Watson's Lane should therefore be declared. One house fronting George Street will finally have to be removed.

8. *GOLD STREET*, from Shakespeare Street to George Street.

This street is only 50 links wide and twenty chains long. Lying between it and Goldsmith Street are allotments 250 links deep. This is just deep enough to allow of houses fronting each street, and one property has already been subdivided in this manner. Gold Street can only be widened on the western side. There the allotments are two chains deep, but the properties as occupied at present are wide enough for their areas not be reduced below the minimum, if their frontages were set back 25 links.

It is therefore recommended that Gold Street be widened to a width of 75 links, by taking 25 links on the western side, and that a re-alignment be declared accordingly.

9. *KATE STREET*, from Goldsmith Street to the Reserve.

This street is only 50 links wide, but its widening is not an urgent matter, as it cannot be extended. The allotments fronting it are two chains deep on the northern, and 250 links on the southern side.

The street would be greatly improved, and be wide enough, if its width were increased to 75 links, by adding 25 links on the southern side. It is recommended that a re-alignment be declared accordingly.

10. *HAYE'S LANE* (No. 3 under "Lanes"). This lane has already been made a residential road by allowing two houses to be built fronting it, without other access. (See Council's By-law No. 96.) Something must be done about it. Either it must be classified as a lane, and the Council's By-law rigidly enforced in future, or it must be made sufficiently wide for residential purposes.

It is recommended that if the lane is widened, sufficient extra width should be obtained on the southern side to make it 75 links wide. The only house affected by this would be that on the corner of Turner Street. It could be moved back sufficiently if a strip were added to it from the adjoining allotment. In the meantime this road should be classified as a lane so that other houses can be prevented from fronting it in its present state.

11. *VINCENT STREET TO MACDONALD STREET.* A connection between the blind ends of Vincent, Kenilworth, Tay, Forth, Pirie, and MacDonald Streets would be of great value to the circulation of traffic. This can be obtained in two ways: firstly, by producing each street to meet McKenny's Road, which would then form the connection between them. This would entail a culvert over the main drain in each case; resuming connections each two chains in length; and enclosing between each pair of streets a small area on which it would not be advisable to allow residences, but which would be of little use for anything else. The main drain, known as "No Man's Drain," has been chosen as a definite and suitable boundary of the Zone for Dairying and Farming (see zoning proposals) and nothing should be done to encourage the further encroachment of residential development on this area.

Secondly, sufficient land could be resumed between these streets on the north side of the drain to provide a connection. This would then form a continuation of the connection already dedicated between English and Vincent Streets. This is 22 feet wide, which should be sufficient for the continuation, if it were classified as a lane. This proposal would have the added advantage of keeping houses further from the drain. There is no reason for the whole connection to be completed at the same time; each pair of streets could be connected as opportunity offers.

The second method is the one recommended.

12. *A NEW ROAD*, from the Nebo Road to Milton Street, along the northern boundary of the railway in Section 58.

This is a connection which is necessary to prevent a series of blind roads, ending at the railway, as they do in Section 59. Grant Street is one such road already dedicated. The road should be 75 links wide, leaving a distance of 750 links to Shakespeare Street. That will be wide enough, with the railway on one side, and as little land as possible should be taken on account of the short length of section remaining. Such a road is possible to obtain now, whereas its cost would be almost prohibitive if development is allowed to proceed as far as in Section 59 before it is provided for.

13. *A CONNECTION*, from Milton Street to James Street, along the north side of the railway in Section 59. It is doubtful whether the expense involved would now warrant putting a road through here for vehicular traffic, but a footpath should certainly be provided. This might be done in co-operation with the Railway Department, especially as it forms an approach to the station. In certain sections it may be possible to provide a lane, such as that between Luscombe and Jubilee Streets, but for this purpose it must be at least 22 feet wide.

14. *A RAILWAY CROSSING at JAMES STREET.*

It is difficult to understand how James Street became closed when the railway was constructed. It would be a much used connection now, and will become increasingly necessary. The distance between Juliet and Milton Streets is too great, and from the air photos there appears to be no reason why the station platform and sidings should not have been placed closer to Juliet Street, thus leaving them clear of James Street. Even if the James Street crossing has to be a closed one, it would be a vast improvement, for the gates could be open most of the time.

Instances of similar crossings are found in Brisbane at Albion and Sherwood stations, where the railway traffic is far heavier than it will ever be at the Mackay Station.

The distance between Milton and Juliet Streets is half a mile, which would be divided equally by a crossing at James Street. Where all railway crossings are of necessity level crossings, it is not advisable

to concentrate road traffic by having too few. If Hamlet and Boddington Streets could be continued along each side of the railway to Milton Street, the need of a crossing at James Street would not be so great, but these extensions are out of the question now, particularly in the case of Hamlet Street, where it would not co-ordinate with existing streets. The greatest improvement that can be made now is to obtain the crossing at James Street.

It is recommended that the Council should raise the question of this crossing with the Railway Department, and not allow it to drop. Even if it takes some years to obtain the crossing, it will be worth while.

RELATIVE URGENCY OF WORKS.

The Council, at first, may be appalled by the number of road improvements recommended herein, and by the probable cost of carrying them out, but it must be remembered that this is a general scheme of development, intended to be spread over a considerable time. Many of the improvements will not be urgently required for many years, but, having the necessity for them in mind, the Council will be enabled to grasp every opportunity to effect them.

The road system has been carefully studied, and it is considered that, if the improvements recommended are carried out, ample means of circulation will be provided for traffic for many years to come, and the undesirable concentration which has already been experienced at certain points, will be avoided.

The order of urgency of the works cannot be entirely determined in this report. The Council must be guided to a great extent by the development that takes place and the consequent growth of traffic from particular localities. There are, however, certain things that should be done as soon as possible, either to relieve existing traffic difficulties or to ensure the future completion of the general road scheme without unnecessary extra expense to the Council. These may be summarised as follows:—

URGENT WORKS.

Principal Roads.

1. *THE NEBO ROAD.* The construction of a good surface from Shakespeare Street to Victoria Street. (Already put in hand.) Rounding the corner of Section 1 on the turn into Victoria Street with a curve of 150 links radius.

2. *THE HOSPITAL ROAD.* Arrangements to be made to either resume or keep clear of buildings the proposed new road along the railway, through Portions 67, 68, and 105, from Holland Street to Bridge Road.

3. *PARADISE STREET.* To resume or to keep clear of buildings the proposed continuation across Portions 218 to 225 to the Broadsound Road.

9. *MACALISTER STREET.* The production to Boddington Street.

10. *BODDINGTON STREET.* Production to meet Sydney Street.

Secondary Roads.

1. *GOLDSMITH STREET.* Formation to be completed to Bridge Road.

5. *McKENNY'S ROAD.* Road to be closed and another dedicated to the north of it, through Portion 90, though not to be constructed at present.

8. *MARRYATT STREET.* Provision to be made for preserving the continuation westwards to Holland Street.

10. *MANGROVE ROAD.* Construction of a good surface to connect the new construction on the Nebo Road with North Street.

Other Streets.

11. *VINCENT STREET to MACDONALD STREET.* To resume or keep clear of buildings the connection between the south ends.

12. *A NEW ROAD,* from the Nebo Road to Milton Street, to be kept clear of buildings, and to be dedicated as means offer.

RE-ALIGNMENTS.

It is evident that by the immediate issue of re-alignment notices under Section 83A (2) of the Amendment Act of 1923, more can be done than by any other means, to save the Council future expense in carrying out street improvements. The process is simple and inexpensive, as by the mere issue of notices to the owners of the land affected, all future building operations can be made to conform to the new alignment. There is no time limit within which the Council must follow up the notice by actual resumption. It is strongly recommended that re-alignment notices be served as soon as possible in all the cases of road improvements summarised below.

In road widenings the notices served upon the owners of all corner properties should provide, except where otherwise stated, for rounding the corners by curves of 50 links radius, in addition to the strip required for widening.

Principal Roads.

1. *THE NEBO ROAD.* The corner of Milton and Victoria Streets (Section 1) to be rounded by a curve with a radius of 150

links. The corner of the Showgrounds, on the turn into Gordon Street to be rounded by a curve with a radius of one chain.

2. *THE HOSPITAL ROAD.* The corner of Portion 48, on turning from Shakespeare Street into Holland Street, to be rounded by a curve with a radius of one chain.

Holland Street to be widened from Shakespeare Street to the railway crossing by taking 25 links from the cemetery and from Portion 67.

4. *MILTON STREET.* To be widened by 50 links on its eastern side, from Shakespeare Street to Archibald Street, through Section 59, Portions 125, 137, 141, 145, 153, the Police Paddock Reserve, and Portion 161.

5. *THE FAR BEACH ROAD.* The corner of Portion 160 to be rounded by a curve of one chain radius.

6. *HUME STREET.* To be widened by 25 links on its south-east side from the northern railway to Lagoon Street through Portion 68, the Pound Reserve, and Portions 70 to 72.

7. *VICTORIA STREET.* All corners of sections where roads intersect this street to be rounded by curves of 50 links radius.

8. *SYDNEY STREET.* All corners of sections where roads intersect to be rounded by curves of 50 links radius, except the two corners where the street narrows in Allotment 8 of Section 61, where the curves have a radius of 100 links each.

9. *MACALISTER STREET.* The production, known as Watson's Lane, to be widened from Shakespeare Street to Boddington Street by 75 links from the properties in Allotment 8 of Section 60, and by 50 links from Allotment 1 of Section 67, and Allotments 1 and 16 of Section 68.

11. *SHAKESPEARE STREET.* All corners formed by streets branching from or intersecting with this street to be rounded by curves of 50 links radius except where otherwise provided for.

Secondary Roads.

1. *GOLDSMITH STREET.* The corner of Allotment 5 of Section 62, at Shakespeare Street to be rounded by a curve of one chain radius.

6. *EVANS STREET.* To be widened to one chain from Milton Street to Juliet Street by the width required (to be stated in the case of each property) from the subdivisions of Portions 125 to 130.

7. *GEORGE STREET.* The corners on the Nebo Road of the subdivisions of Portion 1 and Allotment 1 of Section 58 to be rounded by curves of one chain radius.

8. *MARRYATT STREET.* The south-western corner of its junction with the Nebo Road to be rounded by a curve of one chain radius, and the north-eastern corner with a curve of 50 links radius.

11. *RIVER STREET.* The north-west corners of Sections 32, 37, 42, 47, and 51 to be rounded by curves of 50 links radius.

13. *WOOD STREET.* The corners of all intersecting streets to be rounded by curves with radius of 50 links.

16. *TENNYSON STREET.* The north-east corner of Section 47, at the entrance to River Street, to be rounded by a 50 link curve.

Other Streets.

1. *MILNE LANE.* To be widened by 50 links on the south-west side.

2. *MARY STREET.* To be widened by 25 links on the north-east side. Corners at the Dodson Lane end to be rounded on the new alignment of that street.

3. *DODSON LANE.* To be widened by 50 links from the frontages of Portions 80 to 89.

4. *GIBSON STREET.* To be widened by 25 links on its south-eastern side from Portion 48 to the bend, through Subdivisions 27 to 22. Thence to Shakespeare Street, on the west side, by 25 links from Subdivisions 13 and 12. Both corners at Shakespeare Street to be rounded by curves of 50 links radius.

FORD STREET. To be widened by 25 links on its north-west side from Portion 48 to Shakespeare Street. Both corners at Shakespeare Street to be rounded by 50 link curves.

5. *ROMEO STREET.* Between George and Hamlet Streets. To be widened by 25 links on the east side. All four corners to be rounded.

6. *OTHELLO STREET*. Between George and Hamlet Streets. To be widened by 25 links on the east side, all corners being rounded.

7. *WATSON'S LANE*. Between George and Hamlet Streets. To be widened by 50 links on its west side, all corners being rounded.

8. *GOLD STREET*. To be widened by 25 links on the west side, all corners being rounded.

9. *KATE STREET*. To be widened by 25 links on the south side, both corners at Goldsmith Street being rounded.

ROAD SURFACE UTILISATION.

To plan the surface of roads for efficient utilisation is almost as important as to plan their location and classification. By this means their traffic capacity can often be greatly increased, and their beauty and dignity increased and maintained. It is not advisable to follow the practice adopted elsewhere without applying the experience gained to local conditions. The nature of the traffic and the other services that streets are called upon to carry must be carefully studied, and a layout decided upon that will provide for them all. The full utilisation of each road should be planned, even though many years may elapse before the whole width of carriageway need be constructed. By this means any work of a permanent nature that is done will serve its purpose efficiently throughout its natural life.

The first consideration in Mackay is the unusual composition of the traffic. A mixture of bicycles and motor vehicles is dangerous, and reduces the traffic capacity of a principal road to a marked extent. If the bicycles can be given a separate track the efficiency of the road will be almost doubled, while, where they constitute 50 per cent. of the traffic, as they do in Mackay, they deserve special consideration just as much as pedestrians do.

The width of each separate roadway or track or footpath should be decided upon as a multiple of the width required for a single line of each type of traffic. In the case of motor vehicles, it is now almost universally recognised that a width of ten feet is required for each line, or lane, as it is generally termed. Thus the width of roadways outside the business area of a city, where stationary vehicles do not need to be specially provided for, should be designed in multiples of 10 feet, according to the number of lanes of traffic the roadway is required to carry. A width of seven feet is considered sufficient for standing vehicles. For pedestrians a minimum width of three feet is adopted, whilst for cyclists the width generally provided is 3ft. 3ins.

The capacity of each lane of vehicles, except where roads have been specially constructed for fast through traffic, has been proved by experiment to average about 600 vehicles per hour, but this can easily be doubled and even trebled with special treatment of the layout and special safeguards to permit of increased speed. As the total number of vehicles passing the intersection of Wood and Victoria Streets, probably the busiest in the City, according to the count made by the City Engineer in April, 1932, was 2,361 in 24 hours, it is evident that the lane capacity of traffic is not likely to be over-taxed, on a main

road providing for two lanes in each direction even at 600 per hour, within the vision of this report. It has been proved that a width of carriageway greater than that required for the requisite number of lanes does not add to the efficiency of the road, and only leads to confusion. The width of carriageway should therefore be limited to the width now required, and only increased as it becomes evident that an extra lane should be provided for, but the layout of the road surface, such as trees and drains, should allow for the maximum number of lanes that are likely to be required, or that the width of the road can accommodate.

In considering the pros and cons of duplicate and single carriageways the cost would generally be a deciding factor operating against the former in a city of the size of Mackay. Another factor is the nature of the traffic. On most of the principal roads leading into the City, the bulk of the traffic would be inwards in the morning and outwards in the afternoon. With duplicate carriageways one would generally be taxed more than the other, and widening would be required sooner than with a single carriageway wide enough to carry traffic going in both directions. The view is generally held, however, that where the traffic is too great for a 40 foot carriageway, duplicate carriageways should be provided.

In the business areas the gutters should be constructed without a lip adjoining the carriageway, the camber of which should be continued, and only slightly exaggerated by the gutter. Parked cars will then be able to hug the kerb and move out again without difficulty.

Another problem affecting the layout of roads throughout Queensland is the almost universal presence of telephone and electric light poles. These are not considered in the accepted layouts in most other countries, and the problem of finding positions for them, clear of tree-planting strips, is difficult. It is clear that, particularly in a long straight road, they cannot be placed on the carriageway side of the trees, for the avenue of poles would then hide the avenue of trees. Practically the only other place for them is the outer edge of the footpath where they are generally placed now, but if they are there the trees must be further out, and cannot shade the footpath unless small, low-growing trees are utilised.

Drainage is also a particular problem in Mackay, and one cannot avoid large surface drains that occupy valuable space.

SUGGESTED DESIGNS.

The accompanying designs of surface utilisation are submitted as suggestions only. No design should be universally applied, as monotony in the lay-out of streets is to be avoided.

Primary or Secondary Roads.

1. *Ninety-nine Feet Wide.*

This design would be particularly applicable to the Nebo Road, and to those parts of Victoria and Gordon Streets that pass through the Residential Zone.

2. *Eighty-two Feet Six Inches (125 Links) Wide.*

Applicable to Shakespeare Street, and to the new parts of the Hospital Road and Paradise Street.

3. *Sixty-six Feet Wide.*

It is evident that where traffic roads are one chain wide, trees cannot be placed satisfactorily if bicycle tracks are to be provided. These tracks are considered of more importance on all through traffic roads than trees. The pathways might be made about 15 feet wide, with the poles placed in the middle of them. The outer half could then be allocated to bicycles. The appearance of the street would be greatly improved, and the division between pedestrians and cyclists emphasised by placing a small planting strip, about two feet wide, with flowers or small shrubs on a line between the poles.

4. *Sixty-six Feet Wide, Along a Railway.*

Particularly applicable to Paradise Street. There is generally a drain along the railway within the fence, which it should be possible to utilise as the road surface drain on that side. A footpath along the railway is not required, and its place could be taken by the bicycle track.

Residential Streets.

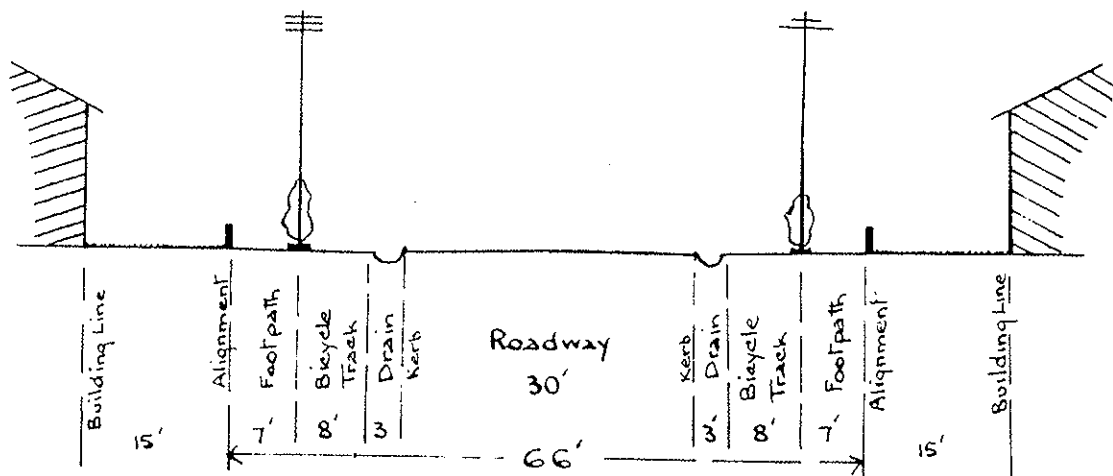
5. *Ninety-nine Feet Wide.*

Applicable to those streets within the original town that will now be classified as residential. The traffic not being a particular

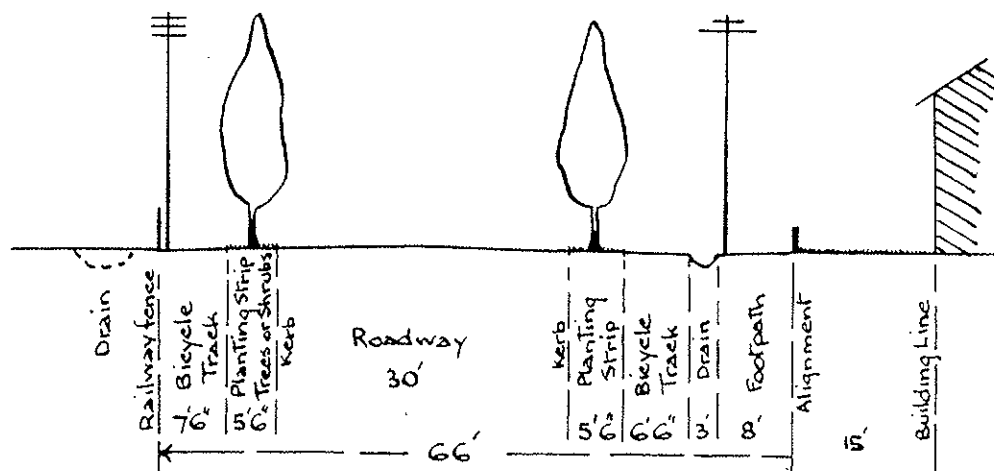
problem in residential streets, there should not be any necessity to separate the bicycle traffic. A 27 foot carriageway should be ample, even for final development.

6. *Sixty-six Feet Wide.*

Many variations should be possible in the layout of residential streets. Until a kerb is placed at the edges of the carriageway, which will probably be many years hence, parking could be allowed on the planting strip.



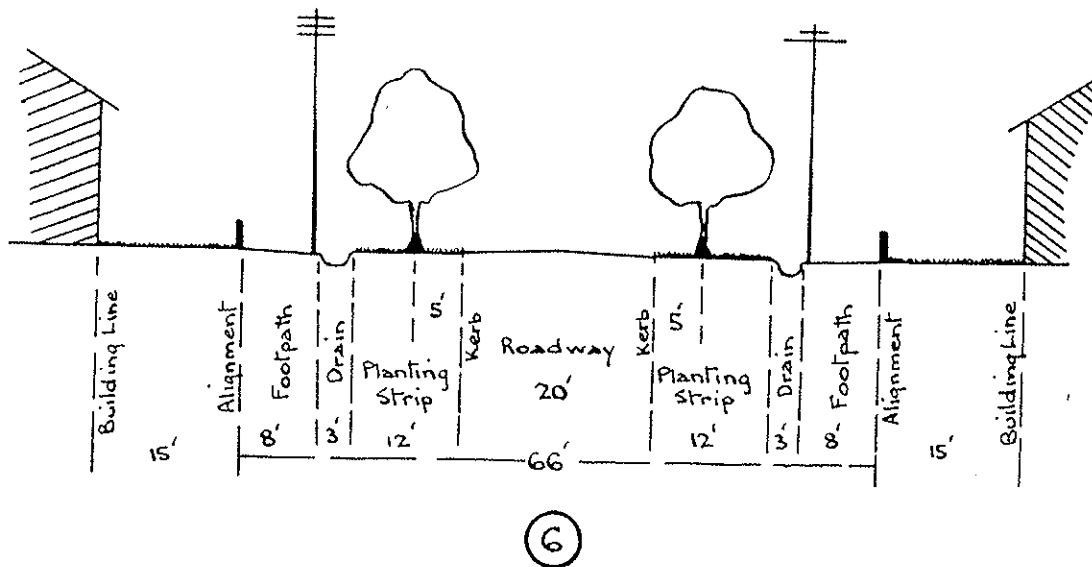
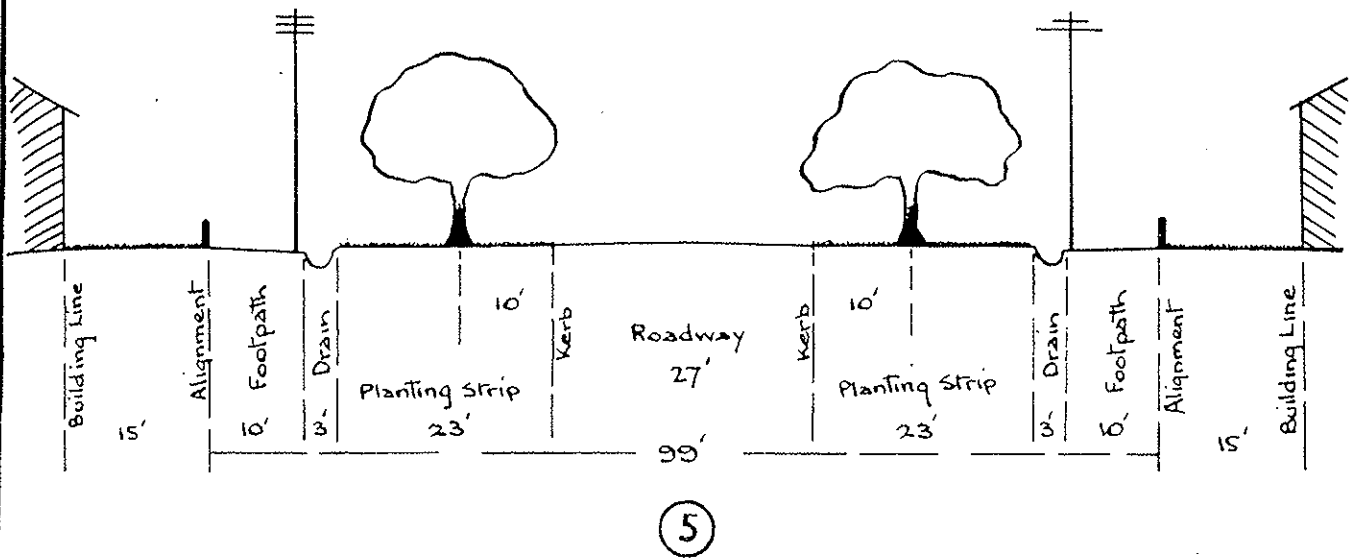
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④



Residential Roads



STREET TREE PLANTING.

The minimum longitudinal spacing for most types of trees is generally adopted as 40 feet.

In choosing trees for street planting the main points to be considered are:—

- (a) Their size. The position in which they can be planted is a deciding factor in the shape and size of tree that can be used. It is much better to choose a tree that is not likely to interfere with overhead wires than to plant near them trees that will later need to be drastically cut, unless they are to be kept pruned. All street trees should have a shapely growth.
- (b) The leaves should not be hairy, otherwise they catch and hold dust.
- (c) Species chosen should not be subject to scale.
- (d) Their root systems should not be of a spreading character, and should not be strong enough to interfere with pipe-mains and water-channelling.

It is difficult to find trees that fulfil every one of these requirements. The experiments being made with local trees should provide species preferable to those imported and which will give the City a more distinct character. However, the following species are recommended for general street use in Queensland by Mr. C. T. White, F.L.S., the Government Botanist:—The Tulip Tree, Cape Chestnut, Pittosporum, Nephelium tomentosum, Crow's Ash, Yellow Wood, Buckinghamia, Harpephyllum, and some species of the Coral Tree. Weeping Fig and Camphor Laurel are valuable additions where their roots will not be likely to rob neighbouring gardens.

From the wealth of trees that are available to a city situated in the latitude of Mackay, with its good rainfall, its well-equipped nursery, and its competent curator, it should be possible to choose species that in a few years will transform the appearance of the streets, and confer a distinctive character upon the City.

INTERSECTIONS.

It is useless to plan roads for efficiency unless a good deal of care and thought is also bestowed upon the arrangement of their

intersections, where the greatest difficulties may arise as the result of bad design. There are many different types of intersections, but only one is illustrated here in order to show how the principles that have been adopted after many years of experience elsewhere may be applied locally.

The illustration shows the intersection of a residential street, 99 feet wide, with a primary or secondary road of the same width, many of which occur in the original town.

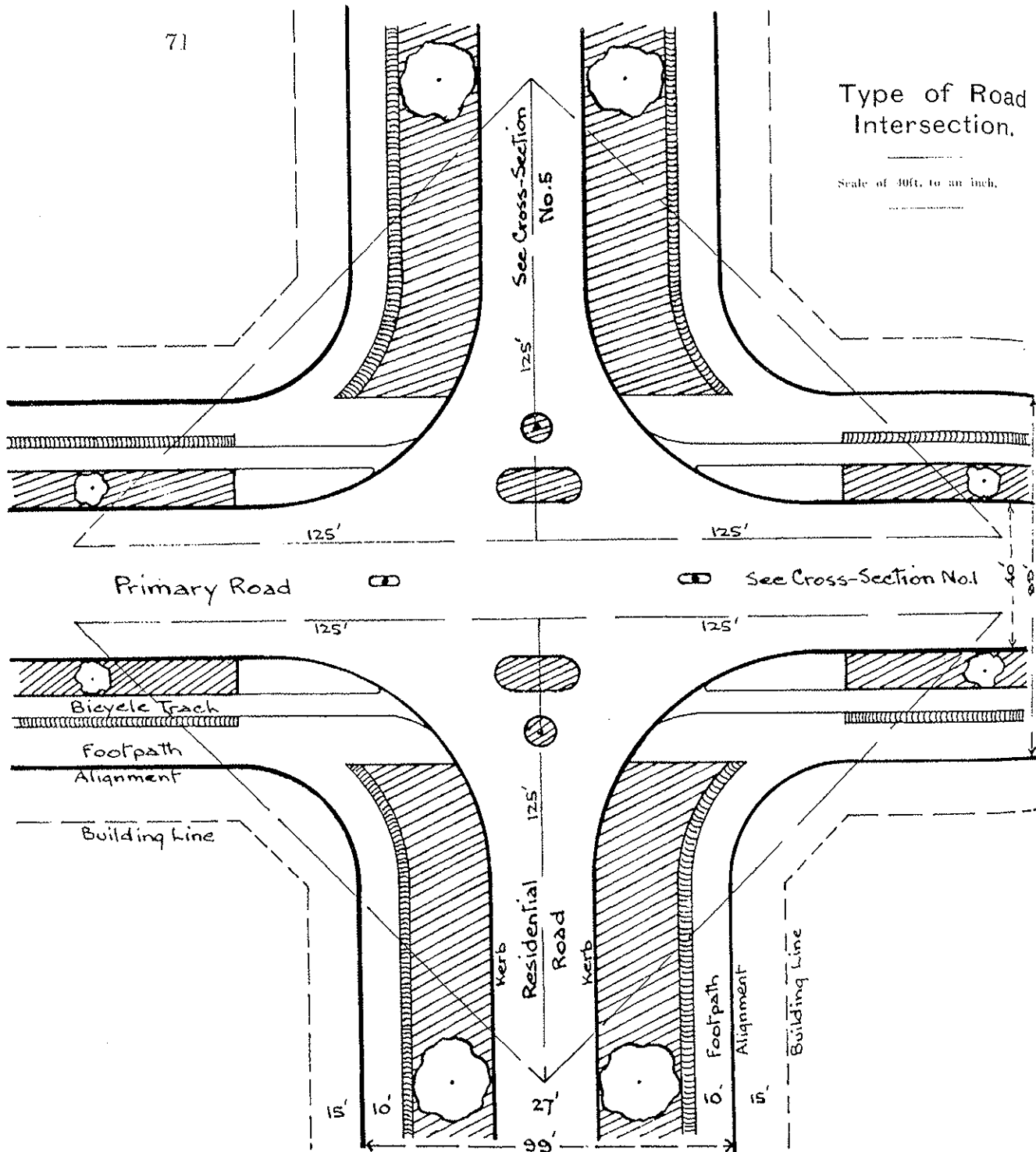
In order to provide sufficient width of vision for traffic approaching the intersection, buildings, and as far as possible, all obstructions, should be set back at the junctions with all important roads behind lines crossing each corner, and connecting points in the centres of the respective carriageways, 125 feet back from the point of intersection of their centre lines. This also applies to trees planted in the road, as shown in the diagram.

Where the streams of traffic approach each other, it is desirable to separate that going in either direction. Where two major roads are concerned, a narrow strip or street refuge will suffice for a division, but where a minor road enters a major one, a larger area may be desirable, so that traffic may be deliberately slowed down. The forms of separation are illustrated. The separating strips offer the opportunity of placing a light or telephone pole in the middle of the road, so that a rounded corner can be negotiated with branching lines without duplicating poles or crossing private property. It is evident that no such obstructions can be placed in the roadway unless the intersection is adequately lighted. Reflectors placed on the obstructing pole would provide sufficient warning to traffic in many instances.

When improving the corner of an existing street, the fence line and the kerb line should be considered separately. It is important to set back the former to the full extent necessary to provide a clear view of approaching traffic, but it is not desirable that corners should be taken at high speed, and this should be borne in mind when the kerb line is laid out. Also a greater width of footpath at a corner adds to the safety of pedestrians. On the other hand, the corner should be sufficiently easy for a motor to take it comfortably and without pulling out, to the obstruction of other traffic. A minimum kerb radius of 30 feet is necessary for this purpose.

Type of Road Intersection.

Scale of 40ft. to an inch.



LOCAL SHOPPING CENTRES.

Shopping centres create and attract traffic, and therefore are not, from the point of view of traffic facilities, well placed at important road junctions. Nevertheless, these situations are favoured by shopkeepers, and due weight must be given to their point of view. At all shopping centres provision should be made for extra width of footpath and carriageway, so that through traffic may not be impeded by persons or vehicles engaged in transacting business. All such centres should be provided with rear access, so that loading and unloading of tradesmen's carts can be done off the road, but that does not remove the necessity for greater space in front, which can be obtained as shown on the accompanying sketch.

The frontage of such shops should not be allowed to encroach beyond the established building line laid down for residences, and the roadway should be widened by dedicating the extra space thus left in front of them.

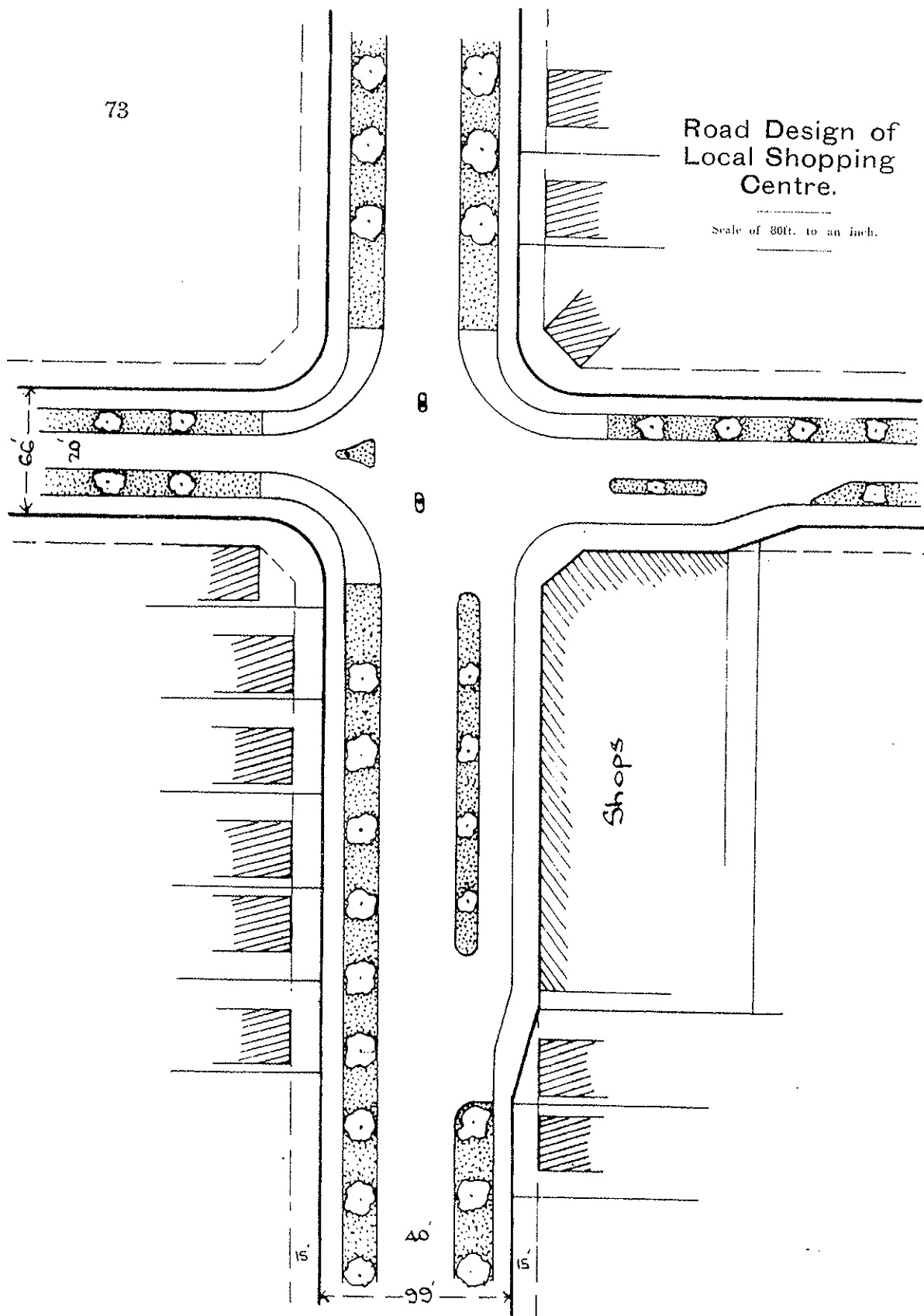
BUILDING LINES.

Building lines must not be confused with the set-back of buildings required by a re-alignment, which virtually becomes the new boundary of the road. The by-law of the Council relating to building lines (No. 95) requires the nearest part of a house in any residential district to be at least 15 feet from the road or 48 feet from the middle line of any road other than a lane or pathway. This applies also to the new road boundary declared by a re-alignment, so that when the road is eventually widened the houses will still conform to the by-law.

A set-back of 15 feet is considered sufficient, but the Council should amend the by-law to enable it to require a greater distance under special circumstances, such as that required at corners in order to preserve sufficient width of vision for traffic. The amendment might be added at the end of the by-law as follows:—"Provided that for any particular purpose the Council may require a building or buildings to be set a greater distance back from the street."

Road Design of Local Shopping Centre.

Scale of 80ft. to an inch.



ZONING.

Soon after the Civic Survey, which preceded the preparation of this report, was commenced, some protests were voiced against the Council's action in having this scheme prepared. The answer of an alderman to this criticism is a fitting introduction to this section of the report. He said: "The only way to open (some people's) eyes to the advantages of town planning would be to place a pneumatic riveting company on one side of their house and a blood and bone fertiliser company on the other."

That would be an extreme penalty indeed for not planning, but it is only the statement of a quite possible occurrence in the unregulated growth of a city without a plan, and is typical of the many undesirable effects of civic development from which numbers of citizens are suffering at the present time. "Zoning" is that part of town planning which is designed to prevent such occurrences. It deals with the subdivision of the City's area into districts or "zones," in which the uses of land can be regulated so as to prevent the indiscriminate mixing of residences, factories, and shops. It is such an important part of town planning that, in America, the whole operation of planning is often termed "zoning."

The object of zoning is to direct development so that each particular phase of city expansion shall take place without detriment to the others, and shall yet be able itself to expand, with every possible facility provided. There is too little stability and permanence of land use and consequently of land and building values in our cities under present conditions, and blighted localities, where values for the original use have fallen without a corresponding rise in those for a new use, are not accidents, but the inevitable result of unguided growth.

The expansion and progress of a small city is controlled to a great extent by its ability to finance and maintain urban improvements and services, and the cost of these can largely be controlled by efficient zoning. In an un-zoned municipality there is no guarantee against the erection of a factory within a residential neighbourhood, requiring large supplies of power, water, or gas, or exceptional sewerage facilities, that would not be required for residences alone. This intrusion may cause a duplication of mains to serve one factory that would be sufficient for a number of industries, while it may attract heavy cartage beyond the strength of purely residential streets, seriously increasing the cost of construction and maintenance.

A compact form of development, without over-crowding, is the most efficient for any city, whether large or small. There may be many vacant sites in a residential locality close to town, but if factories or shops have intruded into it, a prospective home builder would generally choose a site further out, free, for some years at least, from these menacing intrusions. Scattered residential development ensues with the consequent lengthening of service mains for, at the best, a small return to the municipality.

Within the area of almost every city, localities will be found unsuited for residential development, owing to difficulties of drainage, sewerage, or water supply; generally low-lying and unhealthy when closely settled, but suitable enough for farming development, with its scattered houses. Unless such areas are zoned for their proper use, the Council may be put to great expense in a vain attempt to make them healthy residential districts.

Mackay has already experienced all these misfortunes of unregulated growth to a certain degree, but the zoning recommended in this report should prevent their recurrence and go a long way towards removing, in the course of time, some of those that have already occurred.

The chief value of zoning lies in its permanence, and the guarantee that it thereby carries of protection against depreciation of values by an undesirable mixture of development. The necessity for exhaustive investigation of all the factors influencing the growth of the City, before launching a scheme, is therefore evident. However, while maintaining the broad outlines of the scheme, there must be means of providing for the expansion of the different areas and of allowing for a certain amount of elasticity in the regulations under sufficient safeguards.

Any scheme prepared now cannot entirely correct past mistakes in development, but it will reduce such mistakes in the future to a minimum. Existing mixed development cannot be re-organised by regulations without damage to some of the occupiers and the consequent payment of compensation, but it is not proposed to make the zoning retrospective, and nothing proposed in this scheme will render the Council liable to such claims. However, the organisation of definite zones for certain uses, where every possible facility can be given for the users, will undoubtedly, in time, result in many of the non-conforming uses in other zones being moved voluntarily.

The preliminary work of determining the factors that must be taken into account in fixing the zones, and of determining the existing uses, was carried out in the Civic Survey, and particularly by means of the Use and Occupation Survey. A great deal of time was spent in collecting data concerning the existing use of all the land within the city area, and this has been shown on the Map accompanying this report.

The map reveals an unusually large degree of density in the occupation, but several off-shoots of settlement have already occurred. The commercial uses are well centralised, but small local shops, instead of developing in definite centres are scattered throughout most localities. Most of the heavy industries are situated close to the railway, with rail connection, but there are a few so situated that their heavy cartage must traverse a considerable length of streets in the central area, and so that they can never be connected by rail.

The natural position for heavy industry is surrounding the goods railway, from the Gas Works to the wharves. Frequent sidings from any part of the main line would not be countenanced by the Railway Department. There is now a "staff section" between Paget Junction and the Central Station, and there would need to be some very good reason for tapping the line between those points. There would also be a considerable saving to the Council in having heavy industries grouped near the Power House, while if special sewerage were required for any of these industries, it would not have to be carried far.

In Mackay at present there are practically no industries requiring a high degree of isolation. These are often termed "noxious" industries, but the term is really misleading, for an industry is only noxious, or harmful to its surroundings, when it is wrongly placed. There are no "noxious" industries in a properly planned community, but many require a greater degree of isolation than others. An abattoir generally fixes the position of perhaps the main group of isolation industries. It is remarkable that there is not an abattoir or slaughter-yard within the city area, but an important one is situated just outside the south boundary, close to the southern railway. That is an excellent position, and an area zoned for isolation industries could not be better placed than in close proximity to it. The possibility of providing such an area with railway sidings in the future has been taken into consideration,

and this could be done from the main line south of Paget Junction, while drainage and a separate system of sewerage would only need to be carried a short distance to an outfall clear of the City.

The way in which light industry is spreading throughout the whole of the original town area would soon have a depressing effect upon home values there, if it has not done so already, and is sufficient warning of the need for control of further development. Some of those industries, although they were not very harmful when they started, are growing and are definitely becoming a nuisance from a residential point of view.

An example of a blighted area, which should be part of a good residential district close to the City, is that surrounding the western end of Victoria Street. It was spoiled by developing, many years ago, into the Chinatown slum of the City. Many small shops were built facing the street, and screening the conditions that developed in their rear. Most of them were never really necessary as shops, and many are now being used merely as residences or are vacant. The opprobrium which it gained still clings to the locality to a certain degree, though most of its undesirable population has gone. This locality should gradually be cleaned up, and can, with the safeguards of zoning, become a good residential locality.

Another unfortunate circumstance is the intrusion of residential development upon the low-lying land to the south of the City. It is not entirely of modern origin, for several of the subdivisions were made many years ago, but of late years these have been added to. It is evident that, if the City is to be saved from the alternatives of great expense or the development of an undrained unhealthy locality, the further development of this area for residences must be stopped. It is comparatively close to the City and is well suited for milk production, and if retained for this purpose will be able to maintain an adequate warm milk supply for the City for many years to come. Most of it is used for dairying at present, but the houses are gradually creeping up to and engulfing the nearer dairies. It has been proposed that this area be zoned for dairying and farming.

PROPOSED ZONES.

It is recommended that the zoning be regulated as shown in the accompanying table, which is the First Schedule to the proposed Order in Council.

In Column 1 the zones are designated according to their predominant use, and are delineated on the map, which is the Third Schedule of the Zoning Order.

In Column 2 the uses which may be made of the various zones without requiring the permission of the Council are listed. If a person wishes to build for such a use within an area shown on the map as being zoned for that use, he may do so by merely complying with the Council's building and subdivisional by-laws.

In Column 3 are set out those uses which may be made of the different zones, only after obtaining the permission of the Council and complying with the conditions required by it. Conditions such as surrounding open space, the display of advertisements, external appearance generally, and the prevention of any nuisance arising to surrounding owners, may be imposed, so as to preserve the amenity and character of the locality.

In Column 4 are those uses which generally should not be allowed in the zones against which they appear, but the necessity for which may occur. If it is evident to the Council that such a use could be allowed with advantage, it must, upon receiving an application, advertise the proposal, and give anyone interested an opportunity to lodge a protest. After having done this the Council may allow or disallow the application, or allow it upon what conditions it considers advisable, as in the case of Column 3.

In the case of a residential zone the uses in Column 4 (except stables) should only be allowed with a view to extending a local business zone, or to commence the formation of a new one, both of which are alterations which must be gazetted as amendments of the original scheme. Stables might be allowed where there is sufficient area for them to be well away from other houses.

In Column 5 those uses which should be prohibited in the respective zones are set out.

It is not sufficient to name the different classes of uses. In order to give them legal standing the actual occupations included in each class must be set out, and this has been done in the lists which accompany the Zoning Table, as the Second Schedule.

ORDER IN COUNCIL.

Zoning can be brought into operation by means of Sections 186 A and B of the Local Authorities Acts Amendment Act of 1923, and the following is the form of the order that is recommended. The Zoning Table and lists of occupations are included in the order as schedules.

1. The parts of the City of Mackay herein designated as Zones are such as are more particularly set forth in the table, the First Schedule hereto, and shown on the map, the Third Schedule hereto.

2. Those parts of the City of Mackay defined under Zone 1 and shown on the map as Residential Zones, in the First and Third Schedules hereto, are hereby declared to be residential districts.

3. No person shall erect any buildings for use, for the purposes of the various trades, industries, manufactures, shops, and places of amusement, described and listed in the Second Schedule hereto, and such trades, industries, manufactures, shops, and places of amusement are prohibited in the said Zone 1, except in accordance with the provisions hereinafter set forth.

4. The use of any building in the said Zone 1 for any purposes, except in accordance with the provisions of the First Schedule hereto, shall be prohibited, unless the building was being used for that purpose at the date of this order, in which case the use may be continued.

Provided that upon the destruction of any such building or upon the discontinuance for six months from any cause, of such use, the right of continuance shall cease.

Provided also that if, through the expansion of such a use or undertaking, it is desired to rebuild or add to such building, application for permission to rebuild or to make such addition shall be made to the City Council. With such application the applicant shall lodge a statement signed by 80 per cent of the property owners within a radius of five chains of the existing building in question, that they agree to the extension of the undertaking in its present position. Upon receiving such application and declaration the Council may approve, with or without such conditions as it considers necessary to prevent the undertaking from becoming any greater detriment to the locality than it was at the date of this order, or disapprove.

5. No person shall erect, maintain or use any advertisement hoarding within any part of the City of Mackay classified under Zone 1 as a Residential Zone.

6. Subject to the other provisions of this Order, no building shall be erected in the said Zone 1 unless it complies with the by-laws of the said Council for the time being in force relating to buildings and land subdivision.

7. The use and occupation of lands and buildings within the City of Mackay shall be limited to the uses set forth in the First Schedule hereto, wherein the predominant use for which each of the several zones referred to in the First Column is intended to be reserved, is the use indicated in that column, and the classes of buildings which may be erected, or uses which may be made, with or without the consent of the said Council, or with its consent after advertisement, as the case may be, or may not be erected or used in each zone, are as set forth in the Second, Third, Fourth and Fifth Columns thereof.

In giving consent to the erection of a building or to a use being made, where such consent is required, as set out in the Third and Fourth Columns of the First Schedule hereto, the said Council may impose such conditions as it thinks fit. In giving or withholding its consent, or imposing conditions, the said Council shall have regard to the likelihood of the building or use injuring the amenity of the zone, including, in the case of an industrial building, the likelihood of any injury due to the emission of smoke or fumes, dust, noise, or smell, or other cause.

8. (a) Upon an application being made to the said Council, for its consent, in any zone, to the erection of any building, or the making of any use which is shown against that zone in the Fourth Column of the First Schedule hereto, the said Council shall give notice of the said application by advertisement, as soon as may be, in a local newspaper.

The said notice shall be at the cost of the applicant, and shall state that any objection to the application, addressed to the said Council in writing, within 14 days of the date of the advertisement, will be considered.

(b) The said Council shall take into consideration any objection so received, and shall thereupon decide to give or withhold its consent, or to give its consent upon such conditions as it may think fit, and

shall forthwith serve a notice of its decision and the reasons therefor upon the applicant and upon any person objecting under paragraph (a) of this clause.

(c) A decision of the said Council under this clause shall not take effect until the expiration of 21 days from the date upon which the applicant and the objectors, if any, are notified of the decision.

9. The said Council may from time to time vary, add to or delete from the lists in the Second Schedule hereto. Notice of motion concerning any such proposed alteration or addition shall be given one month before it is dealt with by the Council, and, at the time it is given, the notice of motion shall be advertised in a local newspaper, stating the date upon which the proposal will come before the Council, and that objections thereto may be lodged with the Council in writing before that date. Before any such alteration takes effect it must be approved by the Governor in Council and published in the Gazette as an amendment of this Order.

10. If at any time the said Council is of the opinion that any part of the First Schedule, or the boundaries of the zones delineated on the map, the Third Schedule hereto, should be altered, it shall give three months' notice by advertisement in a local newspaper of its intention, stating that particulars regarding the proposed alteration are available at the Town Hall, and that objections, in writing, forwarded to the Council during the said period of three months will be considered. If, at the end of the said period, the Council, having considered the objections, if any, decides to proceed with the alteration, it shall be forwarded, with copies of any objections received, to the Minister. Such alteration shall not take effect until it has received the approval of the Governor in Council and has been published in the Gazette.

FIRST SCHEDULE.

1 Zone.	2 Use that may be made or Buildings that may be erected.	3 Use that may be made or buildings that may be erected, with the consent of and upon conditions imposed by the Council.	4 Uses that may be made, or buildings that may be erected only after advertisement and with the consent of the Council.	5 Uses that may not be made or buildings that may not be erected.
1 Residential.	Dwellings-houses (limit of height 2 storeys.)	Boarding-houses, Flats, Churches, Schools, Private Hospitals, Home Industries. (See List 1.)	Shops. (See List 2.) Special Buildings. Stables. Domestic Industries. (See List 4.)	All buildings more than two stories in height, and all buildings and uses not included in columns 2, 3 and 4.
2 Local Business.	Shops. (See List 2.)	Dwelling-houses as in Zone 1 Col. 2, conforming to frontage by-law. Special Buildings. Domestic Industries. (See List 4.)	Places of Assembly or Amusement. (See List 3.) Hotels. Light Industries. (See List 5.)	As above.
3 General Business.	Shops. (See List 2.) Special Buildings. Places of Assembly or Amusement. (See List 3.) Hotels, Domestic Industries. (See List 4.)	Dwelling-houses and Residential. Light Industries. (See List 5.) Warehouses and Bonded Stores.	—	Buildings for Heavy Industry. (See List 6.) And Isolation Industry. (See List 7.)
4 Light Industry.	Shops. (See List 2.) Hotels, Domestic Industries. (See List 4.) Light Industries. (See List 5.) Warehouses and Bonded Stores.	Dwelling-houses and Residential.	Buildings for Heavy Industry. (See List 6.)	Places of Assembly or Amusement. (See List 3.) Buildings for Isolation Industries. (See List 7.)
5 Heavy Industry.	Light Industries. (See List 5.) Heavy Industries. (See List 6.) Warehouses and Bonded Stores.	Dwelling-houses and Residential. Shops. (See List 2.) All other uses—regulated progressively.	Buildings for Isolation Industry. (See List 7.)	Places of Assembly or Amusement. (See List 3.) Places of Assembly or Amusement. (See List 3.)
6 Isolation Industries.	Buildings for Isolation Industries. (See List 7.)	—	—	Places of Assembly or Amusement. (See List 3.)
7 Farming and Dairying.	Farm Buildings and Residences connected with Farms.	—	—	All other buildings and uses.

SECOND SCHEDULE.

LIST 1.

HOME INDUSTRIES.

(Not requiring the use of a separate building.)

Arts and Handicrafts.	Teaching and Tutorial Work.
Basket and Wickerwork Making.	Toy Making.
Boot Repairing.	Horticultural Nurseries.
Confectionery Making.	(outhouses allowed)
Jam Making.	Photography.
Needlework.	Professional Rooms.
Pastry and Cake Making.	Watch Repairing.

The public display of goods in a window or otherwise, or the exhibition of any advertisement or sign, except signs or notices ordinarily exhibited on dwelling-houses to indicate the name and profession or occupation of the occupant, is not allowed in connection with any "Home Industry."

Any such industry developing sufficiently to require the use of a separate building will pass into another list of industries or shops according to its characteristics.

The keeping and breeding of animals, bees, fowls, or birds shall be deemed to be a home industry, provided that upon a complaint of their creating a nuisance being lodged the Council may take what steps it considers necessary to investigate the circumstances, and if necessary to remove the object of the complaint.

LIST 2.

SHOPS.

Auction Rooms.	Chemists' Shops.
Banks.	Confectioners' Shops.
Bicycle Shops.	Drapers' Shops.
Billiard Saloons.	Dressmakers' Shops.
Bird and Animal Shops.	Fancy Goods Shops.
Booksellers' Shops.	Filling Stations.
Boot Shops.	Fish and Oyster Shops.

Florists' Shops.	Pawnbrokers' Shops.
Fruiterers' Shops.	Photographers' Rooms.
Furniture Shops.	Produce Stores.
Grocers' Shops.	Professional Rooms.
Haberdashers' Shops.	Refreshment Rooms.
Hairdressers' Shops.	Restaurants.
Hardware Shops.	Ships' Chandlers.
Harness and Saddle Makers'	Smallgoods Shops.
Indent Agents' Rooms.	Soft Goods Shops.
Jewellers' Shops.	Sports Depots.
Kiosks.	Tailors' Shops.
Motor and Cycle Shops.	Tobacconists' Shops.
Music Shops.	Toy Shops.
Newsagents' Shops.	Undertakers' Parlours.
Offices.	Watchmakers' Shops.
Paint and Oil Shops.	

In Zone 2, no manufacture employing power-driven machinery of more than five horse power may be used in connection with these shops, nor any manufacture developing its own power or creating a nuisance to neighbours by noise, smell, or dust, or other such cause.

LIST 3.

PLACES OF ASSEMBLY OR AMUSEMENT.

Cinemas.	Meeting Halls (other than Church Halls).
Coursing Tracks.	Theatres.
Dance Halls.	Speedways.
Music Halls.	Stadiums.

LIST 4.

DOMESTIC INDUSTRIES.

Bakeries.	Fuel Depots (without power-driven saw or splitter).
Butchers' Shops (not developing own power).	Laundries (hand).
Builders' Yards.	Public Garages (without power-driven engineering apparatus).

LIST 5.
LIGHT INDUSTRY.

Acetylene and Electric Welding Works.	Firewood and other Fuel Depots.
Aerated Water Factories.	Flock Works.
Assembly Works for Motor and Other Machinery.	Furniture Factories.
Bakeries.	Glazing Works.
Blacksmiths.	Ice and Ice Cream Works.
Boot and Shoe Factories.	Laundries.
Bottle and Bottle-washing Yards.	Livery Stables.
Breweries.	Lumber Yards.
Brick, Sand, and Cement Stores.	Markets.
Broom and Brush Factories.	Mattress-making Works.
Builders' Yards and Stores.	Milk Depots.
Bulk Stores.	Monumental Masons' Works.
Butcheries.	Motor Engineering Works.
Cake or Pie Factories.	Paint-mixing Works.
Canister Works.	Plumbers' Works.
Carpenters' and Joiners' Shops.	Printeries.
Carriers' Stabling Establishments.	Refrigerating Stores.
Clothing Factories.	Smithies.
Coach and Motor-body Works.	Spice Mills.
Condiment, Chutney, Pickle, and Sauce Factories.	Spring Works.
Confectionery Works.	Stock-food Factories.
Contractors Yards.	Sweet and Biscuit Factories.
Cooperages.	Tinsmiths' Works.
Cordial and Soft Drink Factories.	Tobacco and Cigar Works.
Cork Factories.	Toy Factories.
Distilleries.	Upholstering Works.
Electroplating Works.	Vulcanising Works.
Farriers Shops.	Welding Works.
	Wheelwrights.
	Wire and Wire-netting Works.
	Wood-working Factories.

LIST 6.

HEAVY INDUSTRY.

Boat-building Works.	Glass and Bottle Works.
Brick and Pottery Works.	Hide and Tallow Stores.
Butter and other Dairy Produce Factories.	Jam and Preserves Factories.
Canning Works.	Paper Mills.
Cement Works.	Pipe Works.
Cotton Ginneries.	Petrol and Oil Tanks Stores.
Disinfectant and Germicide Factories.	Rope Works.
Dye Works.	Rubber Mills.
Electric Power Stations.	Saw and Planing Mills.
Engineering Works.	Stove Works.
Flour Mills.	Sugar Refineries.
Foundries.	Textile Mills.
Gas and Coke Works.	Three-ply Works.
	Timber Yards.
	Wool Stores.

LIST 7.

ISOLATION INDUSTRIES.

Abattoirs.	Glue-making Works.
Bacon Factories.	Meat Preserving Works.
Bone Mills.	Oil Refineries.
Candle Works.	Oilcloth and Linoleum Factories.
Chemical Works.	Slaughter Houses.
Explosives Factories.	Soap Works.
Fellmongeries.	Tanneries.
Fertiliser Works.	Varnish Factories.
Fish and Oyster Preserving Works.	Woolscours.

Any use that may be allowed in a Residential Zone, or in any other zone in descending order, from Zone 1 to Zone 6, is allowed in a zone of lower order unless otherwise stipulated.

Special Buildings are those of which only one normally occurs in a locality, and are generally public buildings.

District	Persons per acre	Persons per house
a	17.60	5.97
b	26.50	5.62
c	30.15	6.20
d	20.25	4.60
e	20.00	6.05
f	20.16	4.60
Mean	22.44	5.51

Due allowance has been made for people not living in a single-family residence at the time of the census. The above figures are those per acre occupied for residential purposes, not including roads or parks; and those per single-family residence, boarding-houses, flats, etc., being excluded.

The average density per acre for single family residences in the 16 American cities previously mentioned is 28.8, with an average of 5.28 persons to the house, which gives 5.05 houses to the acre.

In English town planning schemes 76.3 per cent. of the area set aside for residential development has a density of between 8 and 12 houses to the acre.

In Melbourne the average density allowed by their town planning Scheme is 30 persons to the acre, including streets, which is equal to 40 to the net residential acre.

A similar density is allowed in the scheme for Perth, where the average number of persons per house is estimated to be 4.7.

It must be borne in mind that there is a vast difference between a compact form of residential development, regulated by wisely framed by-laws, and the congestion which has occurred in most cities, leading to slum conditions in the absence of efficient regulation. Compact development lessens the cost of all civic services. The general tendency in towns and cities in Australia and in America, in the absence of town planning schemes, has been for the population to spread over so wide an area that the cost of providing proper services has been prohibitive.

There can be no doubt that the average density in Mackay will increase. Most of the older subdivisions provided for allotments with frontages of one chain, but in a few localities they are as small as 50 links, which is most undesirable and is liable to lead to the development of slum conditions. The by-laws at present permit a

frontage of 40 feet, but 75 links is recommended in this report as the minimum.

The recommended minimum frontage would generally allow of a density of 6.5 houses to the net acre, which is equivalent to 36 persons. This is practically on a par with the mean density allowed in both Melbourne and Perth.

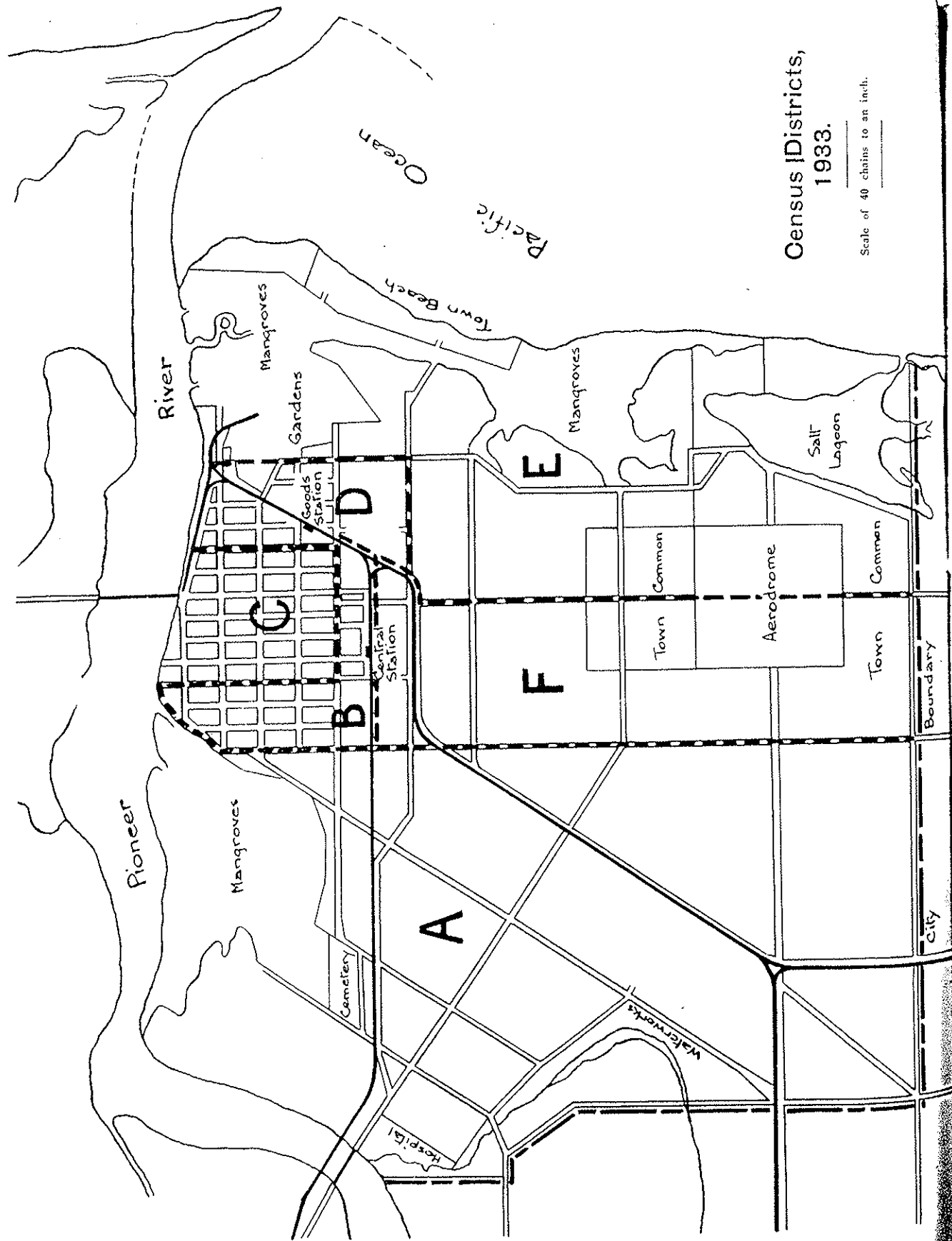
A density of 36 to the acre would enable 15,165 people to be housed on the area at present occupied for residential purposes. At the rate of 2 per cent. per annum increase adopted in this report, Mackay will reach this population about 1950. However, this increase in density is not at all likely to occur, because most of the present frontages of one chain, being under separate ownership, can never be re-subdivided.

During the Use and Occupation Survey a count was made of the spaces remaining on already subdivided land upon which houses could be placed without reducing the frontages used by existing residences. The number recorded was 813. The area included in these vacant sites is not included in that used for residential purposes, so the building of houses on them would not increase the present density on the land already occupied. Eight hundred and thirteen houses would provide for an increase in population of 4,470, which at 2 per cent. per annum will be added to the population by about 1950.

It is quite evident from this analysis that everything should be done by the Council to discourage the subdivision of fresh land for residential purposes. There is almost enough land already surveyed, with closer settlement of the area now occupied, to house the increase in population that may reasonably be expected during the next twenty years, and it will be to the advantage of the community to do what is possible to induce compact settlement upon these sites.

However, it is advisable to zone far more land for residential purposes than is likely to be needed during the period, so that the protective regulations applying to residential zones may keep it fit for residential use when it is needed. The residential areas proposed herein, as shown on the plan, will probably house the increase of population for the next 30 or 40 years if the estimated rate of increase is maintained, but it is difficult to see how Mackay could grow to such a size unless unforeseen industrial development occurs within the City.

The estimated increase of population at 2 per cent. per annum over a period of 20 years is 5,233. If an average density of 30 to the acre is assumed, an area of 175 acres would be added to that used for residential purposes during the period.



Census Districts, 1933.

Scale of 40 chains to an inch.

Census District	Persons per shop
a	900
b	116
c	15
d	250
e	324
f	200

There were 31 vacant shops at the time of the survey, but as more than half of them are situated in the western part of Victoria Street, where the change in the character of the district has already been mentioned, they are not of much assistance in studying future possibilities.

There does not seem to be any immediate probability of a notable increase in the number of shops in the main business centre, for the large and well-established stores could continue to cater for a much greater population and could generally undersell smaller competitors.

It seems inevitable that the number of people per shop will increase considerably, and that new shops will be mostly of the small local type. If the shopping space required during the next 20 years is calculated on the basis of 50 persons to a shop, 95 new shops would be built during the period, and it certainly does not seem that this number will be exceeded.

The average frontage per shop in Mackay is 28.9 feet, as compared with an average of 28.1 feet in the American cities. The most suitable frontage for small shops, planned with rear access is half the minimum for residential purposes, so that a residential allotment can be re-subdivided. It would thus be 37.5 links or 24.75 feet. However, rear access may not always be obtainable, in which case a minimum of 50 links is required. The larger frontage applied to the estimated number, 95, requires 47.5 chains of additional shopping frontage. It has been decided to provide for 50 chains of additional shopping frontage, 30 chains to be allocated to the main centre and 20 chains to local centres, and the shopping and commercial zones have been laid out with this end in view.

The maximum increase in area for shopping would be 12.5 acres if all new shopping sites were laid out with a depth of 250 links, which is that generally occurring in the older part of the City.

THE INDUSTRIAL ZONES.

The area used for industry is 21.25 acres, which is 1.28 per cent. of the total occupied area. The American percentage is 5.29, while for ten English cities the average is 11 per cent. The average amount of land set aside for industry in town planning schemes in England is about 5 per cent.

One would expect the amount of industry in Mackay to be small in relation to other uses, because the chief industry is sugar production, and the mills are always placed well out of the City, where the sugar-cane is grown. No sugar is refined locally, so the industry does not contribute much directly towards the industrial activities of the City.

If Mackay is to continue to grow, its industry must expand. Upon present indications there is little chance of additional sugar-mills being erected in the district, though the production of those that exist may be increased. Everything should be done to encourage the establishment of new industries within the City, and the expansion of those that already exist, and it is recommended that the percentage of the occupied area set aside for industry in the zoning be considerably increased. It does not seem possible that the area would reach 5 per cent., which is a fairly general percentage elsewhere, because of the special circumstances holding with regard to industry, but it would be reasonable to zone about 3 per cent. of the area. This provides approximately 50 acres, and this area has been borne in mind in allocating the zones. A situation has been provided for isolation industries apart from this allocation.

RECREATIONAL AREAS.

One of the most important duties of Local Authorities at the present time, and yet one which perhaps receives their least attention, is the provision of ample recreational areas in our growing cities and towns. Under the artificial conditions of present-day civilised life, outdoor recreation is not merely an accessory to healthy life, but a definite essential. Abundant evidence is available to substantiate the views of town planners, the medical profession, and psychologists that proper outdoor recreation has a most beneficial effect on the health, morals, and the business efficiency of communities, and consequently on the national life. Clean sport is not merely a preventive of crime; it is undoubtedly one of the most powerful character-moulding influences at work in the world to-day.

The mere fact that Mackay is a young city, surrounded by ample open spaces, with few congested living areas, and a housing density of only a little more than four to the acre, are not sufficient for the continued health of the community. The provision of ample public open spaces where people can indulge in all kinds of team games and outdoor recreation is a civic duty which must be fulfilled, and the lack of foresight and attention to this duty in the past is already having its effect upon the lives of the citizens.

ANALYSIS OF EXISTING CONDITIONS.

It may be argued that the percentage of park space in Mackay compares most favourably with that of other cities, and that the analysis of present occupation, contained in this report, shows it to be double that of American cities, but it must be borne in mind that parks and playing areas are only of use when they are so situated that they are readily available to the people they are intended to serve.

The history of the park areas in any of our cities and towns makes sorry reading. Nothing can throw the short-sightedness of past administrations into such bold relief as this does. If the importance of parks to the future city could have been visualised in the past, the idea of utilising them for any public purpose, other than recreation, could never have been entertained. Yet, in Mackay, as elsewhere, park space that would now be invaluable has continually been confiscated for any requirement of the Government without providing anything to take its place.

As mentioned before in this report, practically the only regrettable feature in the design of the original town was the omission of a central square, which, if it had survived successive administrations, would now provide a most necessary rest park and parking-place in the centre of the City.

The original plan provided:—

- (a) Two riverside reserves; one of which is now occupied by the Harbour Board Offices, while the other (Section 64) was hacked to pieces by the loop of the wharf railway.
- (b) Section 69; now subdivided by the Government for Workers' Homes.
- (c) Allotments 9 to 11 of Section 9. Allotment 9 was sold, while Nos. 10 and 11 are now occupied by Workers' Homes.
- (d) The present sites of the Post Office, the Power House, the Police Barracks, and the Technical College.
- (e) Last, but most important of all from a recreational point of view—two whole squares—Section 10A and the present R.266. The first was appropriated as a Drill Shed Ground, and the second for the Railway Yards.

Thus, not one of the reserves set aside in the original design has been retained for recreational purposes. The only areas within this part of the City that are now available for public recreation are: (a) The Reserve (containing nine perches) upon which the Soldiers' Memorial stands, on the river bank; (b) part of the Drill Shed Grounds (about three acres) which the Council has been permitted to develop to some extent as a park, and (c) Allotment 2 of Section 56 (half an acre) of which no use is made at present, but which is reserved for Public Purposes.

The position would indeed be desperate if this were the whole story, but there are playing fields adjoining both the eastern and the western ends of the original town. At the eastern end is a reserve which contains, according to the map, 140 acres. But this is mostly mangrove swamp, and not more than about 30 acres are usable at present. It was first surveyed in 1865 as a reserve for a police paddock, with an area of 30 acres, and was set aside as a reserve for botanical gardens in 1886.

Here the Gardens and the Council's nursery are situated. The reserve contains two cricket pitches with insufficient land surrounding

them, one of the fields being just large enough for a football field. There are also six tennis courts and a Scouts' hut. There is no room for anything else without reclamation of some of the mangrove swamp. This reclamation would be a desirable step from every point of view, but in a flat city like Mackay there is very little spoil from excavations, and reclamation is either a slow or a costly proceeding. In spite of these facts this area has not escaped the encroachment of other public purposes. Excisions amounting to nearly four acres have been made from the park for a school and a schoolmaster's residence.

At the western end of the town is the Showgrounds, a reserve containing nearly 19 acres, most of which was first set aside as a cemetery reserve in 1865. Within the show ring is either a cricket pitch or a football field. This area is enclosed by a high iron fence, and is not open to the public.

Adjoining the Showgrounds are two other reserves, situated between the Nebo and Hospital Roads and a mangrove swamp. They total about 18 acres, but are not suitable for playing fields without reclamation. They are long narrow fringes, and on them are situated the Municipal Stock Saleyards, a shelter shed for unemployed, some of the Council's stables, and a settlement for old age pensioners. These reserves, although classified as park lands, cannot be looked upon as suitable for recreational purposes at present.

These areas at both the eastern and western ends of the City are the nearest playing fields to the City, from the centre of which they are each over half a mile distant. A centrally situated field is badly needed, but its acquisition is now a matter involving costly resumption, and the possibility of obtaining such a field seems remote.

About half the area classified as "Parks" is contained in the Waterworks Reserve, which is more than two miles from the City. This reserve is more suitable for development as an arboretum and scenic park than as a playing area. Most of it has been leased for cane-growing, but the leases are not being renewed, and it will shortly be available again as a park. In 1870 this area was reserved for public recreation. The State Farm was excised from it in 1899. There was a proposal to allocate it as a park reserve in 1932, but it is not clear whether this was acted upon. It can be made the most attractive public open space in the city area, and should be mainly developed as such. There is one practice cricket pitch situated on it at present, but it is doubtful whether any other flat areas, large enough for the purpose, are available.

The only other area classified herein as a park is about 20 acres, situated along the main bathing beach, known as "The Far Beach." The reserve contains 74 acres in all, but not more than 20 acres can be classified as at present available. It is only suitable for development as a seaside bathing park, and is situated about two miles from the City.

There is another cricket pitch situated on the Town Common, but this area cannot be classified as a park until it is definitely set aside as such. Any Municipal or Governmental use may be made of this land at any time, and it would not be safe to look upon it as a park or playing field. No money has been spent upon its improvement, though a good road leads through it from the City.

CLASSIFICATION OF FORMS OF RECREATION.

Before we can appraise the adequacy of existing parks, or estimate present and future requirements, it is necessary to classify outdoor recreation, and lay down some standard as to the amount of land required for each class.

Dealing with recreation in a wholesale way first, we can say that there are two kinds:— active recreation, or physical exercise, and passive or contemplative recreation.

For active recreation provision should be made for all the usual outdoor games or exercises that require greater space than the individual citizen can ordinarily obtain for himself. Parks in various cities provide for walking, riding, rowing, swimming, sailing, football, cricket, hockey, basket-ball, golf, tennis, bowls, croquet, and other such recreations, under this heading.

Under the heading of passive recreation, space is provided for the enjoyment of the beauty of natural objects, from the sight of flowers to the view of a mountain or a river; the enjoyment of man-made beauty in formal gardening, monuments and such things; and the enjoyment of company and crowds in pleasant surroundings, either in the heart of the city or the secluded picnic place.

Having these various forms of recreation in mind, the parks that should be provided might be classified as follows:—

1. *Reservations*—either in their natural state or used as arboretums, for reafforestation or for water supply. These parks may

be made accessible by roads, but are not generally developed intensively for recreational use; they are frequented mostly by picnic parties and others wishing to spend several hours in the open. They are generally within "hiking" distance of the City. Such reservations can hardly be looked upon, or their area requirements calculated, as part of the system of city parks, though they are a necessary adjunct to the system.

2. *The City Park*—more accessible but less extensive than the reservations. Generally made attractive by its design, its foliage and flowers, and sometimes aided by architectural accessories; providing amusements which can be enjoyed by crowds, and laid out to accommodate them. Botanical gardens and city squares are examples of this type.

3. *The District Sportsground*—for the active recreation of adults and young people over, say, 14 years of age, in games that require considerable space, such as football, cricket, hockey, tennis, sports meetings; and capable of use for large formal picnics and celebrations.

4. *The Neighbourhood Playground*—for the general supervised play of children up to 14 years of age, and for older people under special regulations or at stated times.

5. *The Small Rest Park*—providing shaded seats in quiet spots close to busy centres. Generally beautified by beds of flowers or shrubs, and used by people who must spend some time in the locality on business, or as playing-plots for small children living nearby.

Types of all these parks may be recognised among those existing in Mackay, with the exception of No. 4.

AREAS REQUIRED.

The question now arises as to the area that is required to make reasonable provision for these needs. The open space required for the use of any locality depends largely upon the nature of its present and prospective development. In areas where the density of population is small, where ample private gardens and lawns are available, and where the community is relatively wealthy, there is less need for public reserves. However, in those areas which are densely developed, where yards are small and families are poorer, their need of the space and conditions supplied by the park and the playground must be met.

The park requirements of different localities have in many instances been judged and estimated by stating their percentage to that

of the total area, but this can lead to widely differing results. Topographical and other conditions have a material effect upon the number of people residing in any neighbourhood, which the open spaces are designed to serve, and the best results have been obtained by estimating and comparing such requirements upon the basis of the population to be served.

The Small Rest Park. Generally speaking, Mackay, with its liberal-sized home allotments, provides ample space for children who are too young to use the equipment found in modern playgrounds, and, except in the centre of the City the need of these parks is not yet acutely felt. However, they are needed in certain localities, and provision should now be made for the future.

No standard area requirement can be laid down for them, but they can advantageously be placed where they are within easy reach of busy quarters and the more densely occupied areas, where a vacant allotment or odd corner can be obtained. The small park beside the Town Hall, along the pathway to the Court House, the reserve upon which the Soldiers' Memorial stands, and the Station Square are instances of this type of park. No opportunity should be lost of obtaining similar parks at intervals of about a quarter of a mile, but where other parks or playgrounds are provided, part of their area can be devoted to this use.

The Neighbourhood Playground. This type of recreational area is perhaps one of the most important, and yet that most neglected throughout Australian cities and towns. It should be a recreational centre for the community which it serves, providing for small children, post-school youths and girls, and for some of the more contemplative forms of recreation for adults. When fulfilling its complete function it would provide a playing area equipped with apparatus, such as swings, slides, a wading pool, giants-stride, seesaws, etc., and a ground for organised games for small children; quoits, tennis, basket-ball, a practice cricket, hockey or football ground and open air gymnastic equipment for older children; and a meeting or social hall and library.

Such community centres are generally commenced as children's playgrounds, but no attempt should be made to provide them with equipment unless some form of supervision can be provided. Regular supervision is an absolute necessity, as proved by experience wherever children's playgrounds have been equipped, and much valuable information as to the method of conducting these recreation centres,

which would save wasted effort, could be obtained by communicating with such bodies as The Playgrounds Association in Brisbane and the Parks and Playgrounds Movement of New South Wales.

Children's playgrounds, as generally understood, are small areas equipped with apparatus. At first very little land would be required, but their eventual development as community centres must be borne in mind if the difficulties of expansion are to be avoided. There are three such playgrounds in Brisbane, and the expansion of their area is a problem with them all. For this reason, where it is possible, small areas should be set aside for them in the larger parks, but their location is a matter of the greatest importance. They must be central for the community they are required to serve, and within convenient walking distance. It is generally considered that if the distance to be walked is over a quarter of a mile many children are unable to use them as they should.

The actual proportions of the age-groups of the population are unfortunately not yet available from the census authorities, but in Melbourne it was estimated that 20 per cent. of the population was comprised of children between the ages of 4 and 14 years. Naturally, only a proportion of the children in any area would be using a playground at the same time, and it is generally considered that 50 square feet per child is sufficient open space to provide. On this basis, at least a quarter of an acre of children's playground space would be required per 1000 of population. This is the allocation made in both Melbourne and Perth.

In Mackay, taking the probable density of complete occupation at 36 persons to the residential acre, there would be about 4,000 persons housed in a quarter of a square mile when due allowance has been made for roads. This area would ensure a walk of not more than a quarter of a mile, as advised above. Thus a playground in such an area, solely for small children should have a minimum area of one acre. But the Paddington Playground in Brisbane, which is now approaching full use as a community centre, contains about three acres, and it is cramped for room. This is partly because of the increasing use made of it by unemployed youths—a tendency that should be encouraged and is likely to increase. The following extract from a paper read before the recent Annual Conference of Rural District Councils in London bears this out:— "To-day in the midst of an unprecedented economic crisis, one fact stands out with startling clearness. It is that hours of labour are likely to become shorter and shorter, and the hours of leisure correspondingly to increase. If only

to ensure that those hours of leisure shall be wisely used, to the happiness of the individual and the good of the State, it is of vital importance that the reproach of those who at present have 'nowhere to play' shall be removed."

The allocation made in Melbourne may be sufficient for its particular purpose, but if a playground is eventually to serve as a supervised community centre it is considered that it should have an area of at least three acres, or three-quarters of an acre per 1,000 of population.

The District Sportsground. The minimum number and acreage of playing fields required must be determined by the number of teams desiring to play the various team games at the same time. It is essential that provision be made, not only for those clubs and associations who require to lease areas and improve them, retaining them for their particular use, but also for those junior teams and others who require space to play on at odd times. A great mistake has been made in most of the larger cities in leasing all the available sportsgrounds space to organised sporting bodies. In a small city like Mackay the proportion of the population requiring this form of recreation would be less than in a large city like Melbourne, chiefly because the open country is more accessible. In the Melbourne report it was stated that about 17 per cent. of the population is between the ages of 15 and 25, from whom the greatest proportion of sporting enthusiasts is drawn. It was then estimated that half of this number were male and half female, and provision was made for the males only, on the basis of one in four. By this means it was decided that three acres, or one cricket or football field should be provided for every 1,000 of the population.

A true estimate cannot be obtained from the clubs or associations in existence at present, because there is little doubt that if better facilities were provided more people would play. The increasing desire and leisure for sport and the growing tendency among girls to play team games must also be taken into consideration.

It has therefore been decided to take the Melbourne estimate of three acres per 1,000 as the minimum requirement for this type of open space, in spite of the difference in size between Melbourne and Mackay.

Other Recreational Areas. In addition to the areas dealt with above, allowance must be made for certain other forms of active recreation, such as tennis, croquet, bowls, etc. The area required for their accommodation is comparatively small and they can often be

provided in parks, gardens, and other lands, unsuitable in shape or size for the larger fields. The public needs for these games are greatly reduced by the amount of private and semi-public accommodation for them.

In Melbourne an area of one and three-quarter acres per 1,000 was allowed for all park purposes other than playgrounds and playing fields. This allocation was followed in Perth, but it makes no allowance for reservations. On comparison of this area with that recommended in other parts of the world, it has been decided to advise an allocation of two and a quarter acres for these purposes.

Total Area Required. The above analysis of park and playground requirements shows that six acres per 1,000 of the population should be provided for. Comparisons can be made with this as follows:—

Mackay, at present, total area	19.5 acres per 1000
Mackay, recommended developed minimum	6.0 acres per 1000
Melbourne and Perth not less than	5.0 acres per 1000
Melbourne, at present, about	6.5 acres per 1000
Mean, existing, 16 American cities	5.0 acres per 1000
Recommended in American Survey	10.0 acres per 1000
Recommended in England.....	6 to 8 acres per 1000

From this comparison it appears that the recommended minimum is not excessive. It also seems that Mackay already has sufficient park space to amply provide for a population three times its present size. But our analysis has shown that at least five-eighths of the total of six acres per 1,000 should be available to the people as sports and recreation grounds. For the present population this would represent an area of 40 acres, whereas the area actually available is only about 15 acres, including less than eight acres for the two pitches and the tennis courts in the Gardens, about four acres in the ring at the Showgrounds, and, say three acres in the Town Common.

Another method of viewing the present park area is this: A city can only hope to have large park areas close to the centre if they are provided early in its history. The total present park area in Mackay is 208 acres. Within or touching the circle with a radius of two miles from the centre of Melbourne are at least six large parks, totalling about 1,600 acres. Two of them contain over 450 acres each. In the central district of Sydney there are 2,150 acres devoted to parks. The time can be visualised when much larger central

park areas than exist at present will be needed in Mackay. Luckily there are two large swamps adjoining existing parks which in course of time will be reclaimed and provide what will then be much-needed additional park space. But without them Mackay would be making an almost hopeless start as regards her provision for parks. Another bright spot is the Town Common, which should be definitely allocated for the purposes of recreation and so prevent it from being further whittled away for sundry public uses.

The result of our investigation is therefore as follows:—

Mackay at present has 208 acres of park land, of which about 50 acres are usable by the public and 18 acres used as the Showgrounds, but not open to the public. The 50 acres comprises 27 acres in the Gardens, 20 acres at the Far Beach, and three acres in the Drill Shed Reserve. Of this area about 12 acres is used for sports (excluding the pitch on the Town Common, which is not a park).

In accordance with the estimated minimum requirements the areas should be:—

- 65 acres open to the public and in intensive use, of which
- 8 acres should be devoted to playgrounds,
- 32 acres should be devoted to sportsgrounds,
- 25 acres should be devoted to other park purposes.

In twenty years' time the requirements on the same basis will be as follows:—

- 96 acres for all park purposes, made up of
- 12 acres for playgrounds,
- 48 acres for sportsgrounds,
- 36 acres for other park purposes.

The present additional requirements are therefore eight acres for playgrounds and 20 acres for sports. There is, by acreage, sufficient park space at present for other purposes, but this is almost entirely in the Gardens and at the Far Beach, which is hardly developed at all at present. It is considered that at least 15 acres of additional park space should now be developed where it is more accessible to the residential areas furthest from the Gardens.

The total area of developed parks should be increased at the rate of about two acres per year, over the next 20 years.

These are the minimum requirements. On looking over the existing park areas, it will be realised that there is in reality very

little development. Every effort should be made to improve the existing parks, but this is certainly a secondary matter to the acquisition of the necessary land, because land becomes more valuable year by year, and furthermore, the present depression of values possibly gives opportunities for acquiring desirable areas which may be lost in a few years' time.

It should be noted that these estimates do not include park reservations.

GENERAL RECOMMENDATIONS.

THE TOWN BEACH.

Many beautiful natural picnic spots have disappeared from Mackay and its surroundings during the last thirty years. Their destruction in most cases was needless, and has served no good purpose. To a very marked extent it has been caused by the wanton destruction of the natural trees. The most important of these was the land fronting the Town Beach. Here, within a mile and a half of the centre of the City was one of the most delightful picnic spots that one could imagine, extensive enough for picnics or celebrations of almost any size. Here such events as the annual Sunday School picnics were held amid ideal surroundings. Nature had supplied groups of large trees, providing ample shade from the hot tropical sun, open grass patches upon which races could be run, high hills of loose sand to be slid down, and safe and sufficient bathing facilities. What an asset has been lost to the City! How did it happen?

The sea-front was alienated; the sea encroached; the big trees were cut down; and the cyclone swept the remainder, unprotected by the giants that had withstood many storms. The sea-front was under private ownership, but it was evidently too dangerous to build there. What use could be made of it? More timber was cut for firewood, sand was taken away for various purposes, and among the bushes and undergrowth a colony of "unemployed" now have their camps. A more deplorably neglected and ruined sea-front than it is now would be hard to find in close proximity to any city.

The fault does not lie so much with the Municipality as with the Government. The land was first surveyed into portions in 1867, two years before Mackay was proclaimed a Municipal Council. An esplanade averaging about 150 links in width then existed along the foreshore. Portions 349, 350, and 351 were sold. Portion 348 was proclaimed a reserve for a "Manure Depot" upon the application of the Council in 1877, and Portions 352 to 357 were declared a Recreation Reserve at the same time. But apparently their value for recreation was not great enough then, and in 1881 they were turned into a rifle range. There is always a percentage of people in any community who love the sea-front, and the danger of a rifle range in that position must soon have become apparent, for in 1888 these portions and the "Manure Depot" were resurveyed and offered for sale. It was then found that the sea had encroached considerably. Since 1867 it had advanced as much as five chains in places, and the esplanade had entirely disappeared. Of the three portions that had been alienated, with an area of nearly 17 acres, only 12 acres remained. But nature's warning was not heeded and the remaining portions were sold.

It should be noted that between 1867 and 1888 there was no cyclone of importance to aid the encroachment of the sea. But there was a big cyclone in 1898. The sea-front was still unspoiled, from the picnickers' point of view, in 1900, because the big trees remained and protected it from even the cyclone in 1898. But before that of 1918 occurred the trees were gone and the wind was able to do greater havoc.

No survey of the whole front has been made since 1888, and it is impossible to say how much the sea has continued its encroachment, but what remains of the portions should certainly be converted into a reserve for recreation and the strictest measures taken to encourage the re-growth of a natural wind-break. The value of the remaining land to its owners must be small, and it would probably pay some of them to give the land to the City and thus be relieved of the burden of rates. If not, it is recommended that the land be resumed, and that Portions 355 and 357, which were reserved for special Harbour Board purposes which now are non-existent, should be converted into part of the Recreation Reserve.

The park thus created would come under the category of "Reservations," and it would be unnecessary and unwise to spend money upon its development until it is sufficiently protected by a new growth of large trees.

THE MANGROVE FLATS.

It seems that most of the future playing fields of Mackay will be situated upon land that is now useless mud and mangrove flats. Their reclamation would add to the attractiveness of the City in many ways. Where these flats are close to the River, this can best be achieved by depositing sand and silt upon them by means of dredging. If the present Harbour Scheme on the North Beach is completed there will probably be little need to maintain a channel in the River, and it may be many years before these flats can be reclaimed, but if, for any reason, further dredging in the River becomes necessary, arrangements should certainly be made with the Harbours and Marine Department to employ a type of dredge that would accomplish the dual purpose.

The first areas to be reclaimed by this means would probably be R.364, at present a reserve for Harbour Board purposes; R.253, reserved for public purposes; and R.389, a reserve for the storage of explosives, situated between the City and the beach. These areas are not used at present, though the sewerage outfall will cross them and the treatment works will occupy part of them. As they contain about 80 acres, a large area will remain, which should be reserved for recreation purposes. This park would then adjoin the Gardens Reserve with an area of 140 acres, and the whole, when reclaimed, will provide a recreational area which any city would envy. It is situated within a radius of one mile from the Town Hall.

To the west of the City and also within the one mile radius is another area of mangrove swamp (R.249) containing about 300 acres, which is capable of similar development. No part of either of these areas should be alienated, and they should be reserved for recreation.

THE TOWN COMMON.

The Town Common (R.277) was a reserve of 600 acres, situated in the south-east corner of the Municipality. It was first proclaimed as such in 1873, extended to the sea-front in 1877, and placed under the control of the Municipality. In 1929 an area of six acres was excised from it for the present Sanitary Depot, and at the same time Portion 343 and R.261, in which the Far Beach is situated, were proclaimed as a Recreation Reserve, with an area of 74 acres. In 1930 the aerodrome, with an area of 182 acres, was excised. Portions 154 and 155 are utilised for municipal purposes.

The cricket pitch previously mentioned is situated on Portion 158. It is recommended that Portions 158 and 159 be reserved for public recreation. They have an area of 88 acres and will provide space in the future for as many playing fields as are likely to be required in this locality. It is one and a half miles from the Town Hall. As soon as this area is allocated a scheme for its development should be prepared, providing for its growth as a sports area for many years ahead, so that trees can be planted and other permanent improvements made from time to time.

The remainder of the Town Common, being Portions 238, 239, 241, 243, 345, 344, and 164, should be converted into a park reserve. They have an area of about 240 acres. It is unfortunate that when the aerodrome was being excised the matter of access to this part of the Common was not considered. The continuations of Juliet and Archibald Streets through the aerodrome have been closed, and the whole area will certainly require to be fenced very soon. Access should have been retained across the north-east corner of Portion 163 to connect 159 and 164 and down the west boundary of Portion 162, connecting Portions 158 and 238. These connections will certainly be required in the future.

THE SHOWGROUNDS.

The present location will soon be found to be unsuitable as a Showground, the chief drawbacks being the lack of rail connection and the difficulties of further expansion. There are vacant reserves across the Nebo Road, but as this is the main entrance to the City it would be very unwise to extend the grounds across it. The traffic circulation of the City has already been interfered with by closing the end of Alfred Street, but this was a comparatively unimportant street. Closure of the Nebo Road is not to be thought of, and the creation of cross-traffic, mostly pedestrian, is too dangerous, and with the growth of both traffic and show activities would, in years to come, be intolerable.

If it should be found advisable to move the Showgrounds, a suitable site is available in "The Grammar School Reserve." As far back as 1878 it was proposed that this reserve should be utilised as the Showgrounds. With the growth of high school education it may never be needed for the purpose for which it was reserved. It adjoins the railway and contains sufficient area to accommodate all show activities for as long as can be visualised at present. In the event of a move ever being made, the present site should be retained and intensively developed as a sports-ground.

THE DRILL SHED GROUND.

This is an ideal site for a Neighbourhood Playground. It is in a central position in a closely occupied residential district and is of sufficient area to accommodate a completely equipped community centre. If it were used for this purpose there would not be room eventually for the Drill Shed also, and it should not be equipped as a playground unless some agreement can be reached with the Military Authorities to eventually move the Drill Shed to another site. This would not be necessary for some years to come, but it would pay the Council to allocate another area (for instance, where the saleyards or Special Lease No. 3104, adjoining, now are) if an agreement can be reached.

THE RIVER.

Although a glance at the plan of Mackay suggests that it is ideally situated for aquatic sports, that is not so. The large tide, reaching a height of 15 feet at times, creates dangerous currents, while the river bed is mostly a stretch of sand for some hours at low tide. The conditions are such that it has never been possible to hold the North Queensland Regatta at Mackay. A large riverside park will be provided if the mangrove flats towards the mouth of the river can be reclaimed as previously suggested, and this would be the first step towards making aquatic sports possible. Swimming baths cannot be constructed in the River owing to the conditions of the tide. They are badly needed, and the Council should do all that is possible to have them established somewhere close to the centre of the City. The proposal to utilise the yard at the back of the Town Hall is an excellent one, but the effect of the baths upon the quiet of the Court House must be considered. Swimmers do not generally take their recreation quietly. For this reason it might be advisable to utilise some low-lying vacant space further away, such as that in Section 37.

The river-front would be greatly improved at the western end of the town by filling in the strip of mangrove flat which lies between the river-bank and the line of the stream. This strip lies at the ends of Nelson and Macalister Streets and opposite the adjoining residential sections and is made obnoxious at present by the storm-water sewers from both these streets, which end at the bank and discharge onto the mud. If these sewers were carried out to the stream and the mangrove strip reclaimed, a very desirable riverside rest park would be formed, adding greatly to the value of property in this locality.

THE SALEYARDS.

The present position of the Stock Saleyards is a bad one, as will be more fully realised when the Nebo Road has been constructed to Victoria Street. A better position would be anywhere down Milton Street, south of the southern railway. It is understood that negotiations have been entered into with this object in view, and it is hoped that the Council will be able to accomplish the alteration.

The present position is bad from the points of view of traffic—both the movement of stock and the vehicles of sellers and buyers; of future extension; and of adjacent paddocks or resting areas. It may not be of importance at present, but it should prove to be an advantage to have the saleyards in the same locality as the dip, and on the same side of the City as the abattoirs. Many cities suffer from having to permit stock to be driven through the streets, but it can be avoided in Mackay.

THE POUND RESERVE.

There was a proposal in 1928 to have this reserve set aside as a Recreation Reserve. This is its natural function, and one for which it will be greatly needed in the future. The Pound would be more naturally place, say on Portion 154 of the Town Common or somewhere close by, thus being grouped with the other facilities for dealing with stock—the dip, saleyards, etc.—in the area which is zoned for farming and grazing.

DRY REFUSE.

Much waste land can be reclaimed, improving surrounding property and increasing it in value, by the judicious use of dry refuse. It is being dumped at present behind the saleyards, and good reclamation is being effected, but what is being done does not appreciably increase the value of any property. The mangrove swamp that is being filled in is too large and the process too slow for the full benefit to be reaped. Such areas as the river-front, in the western part of the town, and the Gardens Reserve, towards the east, would show a quicker return. The mud flat to the north-east of the railway yards would soon be converted into a playing field by means of the refuse, as it would not require to be raised more than a few feet.

LAND SUBDIVISION.

The importance of proper control of the subdivision of land cannot be over-estimated, because the subdivisions that are now being made in outer suburban areas determine the layout of the City, upon which large sums are ultimately to be expended. Far-sighted control can save the ratepayers from a great deal of unnecessary expenditure, and is still more essential when a plan of development has been prepared.

Until the Local Authorities Acts Amendment Act of 1923 came into force Local Authorities had insufficient powers in connection with land subdivision, but they are now able to do all that is necessary to ensure reasonable provisions being made for the future.

Recommendations are made in connection with the various clauses of the Act as follows:—

Section 57c. (1). "Every new road shall be classified before it is opened, and shall be opened to or beyond the minimum standard width for its class."

Before the Amendment Act of 1923 was passed the width of new streets was governed by the Undue Subdivision of Land Prevention Act of 1885. This laid down one minimum width—namely, one chain. As there were no plans to guide development, every street of primary access was of the same classification, and the width of one chain became a standard which was practically never exceeded.

The Act now lays down a minimum for each class, but these widths are based upon average conditions. The flat nature of the City of Mackay and the heavy rainfall necessitate unusually large surface drains, and these should be taken into account. The minimum widths recommended for new roads in Mackay are:—

- | | | | |
|----------------------------|-------|-------|-----------------------|
| (a) For a Principal Road | ..... | ..... | 150 links (99 feet) |
| (b) For a Secondary Road | ..... | ..... | 125 links (82.5 feet) |
| (c) For a Residential Road | ..... | ..... | 100 links (66 feet) |

The Act allows the Council under special conditions to accept a residential road of less width than one chain, but it is recommended that no such reduction should be allowed in Mackay.

Section 83c. (5). End of last paragraph—"and not more than

one house shall be erected or rebuilt on an allotment or portion of land unless with the approval of the Local Authority." (Schedule 4, Subdivision 6 (vi.))

If a Council does not maintain this regulation strictly, it has no control over housing density. There are two methods of preventing overcrowding: one is to fix a minimum area and frontage for residential subdivisions, and to strictly adhere to this regulation—that not more than one house shall be built on any subdivision of land; the other is to carry out Sub-Section 5 of Section 83c. to the full and lay down the maximum standard number of houses to the acre to be permitted. Under the conditions existing in Queensland the most effective method is the first. It can be imposed with little disturbance of existing procedure and is much easier to regulate than the second method.

The Council already has a by-law (No. 100) which partly accomplishes this, but it allows the building of another house where the area of the subdivision is greater than twice the minimum area. This means that the second house may be erected so that when the land is eventually subdivided the subdivision cannot conform with all the Council's requirements. The Council would have complete control of every situation that could arise if it were necessary for an owner to have a plan of subdivision approved before building the second residence. This would follow the procedure in Brisbane and other cities and can be accomplished by means of the following by-law:—

"Where a building exists upon any parcel of land, no plan for the erection of any other building intended to be used in separate occupation shall be approved by the said Council, nor shall it be lawful for any person to erect or re-erect, or commence to erect or re-erect any other building as aforesaid until a plan of subdivision or re-subdivision of the said land has been approved by the said Council."

Section 83c. (11). In respect of any application for approval of the opening of a road, the Local Authority shall take into consideration:—

"(a) The situation and planning of the road in relation to public convenience, present and prospective, and to inter-communication with neighbouring localities."

A Local Authority is here instructed to take into consideration those things which go to make a good road—system in their area when

land is being subdivided, but it is not clear whether they can pass by-laws regulating such things. If by-laws cannot be passed there is no reason why the Council should not adopt regulations making it clear to land-owners what will be considered good planning of roads, as follows:—

(1) "Where any land is bounded by a railway line, any plan of subdivision shall provide that a road of approved width be dedicated adjacent to and along the whole length of such railway line."

This regulation is designed to prevent rows of back-yards being presented to travellers by train. A great many people judge a city by what they see of it from a train in passing through, or coming and going, and the opinion spread by such people can do a great deal of harm or good according to the impression received.

(2) "In the subdivision of any land for residential purposes, no street shall be planned of a greater length than ten chains without a cross-street, provided that where special circumstances arise the Council may vary the length between cross-streets where such variation improves the general layout."

The advantage of this regulation is obvious, and the need for it is shown in several suburban subdivisions, some of which have roads 20 or 30 chains in length without cross communication.

Section 83d. "It shall not be lawful for any person upon land which is so situated as not, in the opinion of the Local Authority, to be reasonably capable of being drained, to erect any building to be used as a dwelling, etc."

The need for action to be taken under this section has already been discussed under "Zoning." Under existing legislation the Council cannot prevent the subdivision of land in such localities, but it can prevent the erection of houses. It is therefore very necessary that land-owners should know definitely where houses will be prohibited and under what conditions, so that they will not proceed with the subdivision of such land for residential occupation.

It is recommended that the following by-law be enacted in place of existing By-law No. 99:—

"No dwelling shall be erected or adapted to be used as a dwelling upon any subdivision or re-subdivision of the portions of land hereunder enumerated, this land being hereby declared to be not reasonably capable of being drained."

"Provided that the erection of dwellings upon land which has, previous to the date of this by-law, been subdivided for residential purposes may be permitted under the conditions which may be imposed in each individual case, and:—

"Provided that dwellings built as residences upon farms with an area of not less than five acres may be erected where satisfactory arrangements can be made by the owners for the individual disposal of their drainage."

The portions of land to which this by-law applies are:—Nos. 90 to 100, 102 to 104, 105 (north of the railway), 137 to 153, 156, 160, 161, 168 to 171, 218 to 225, 227 to 231, and 233 to 237.

Schedule IV, of the Principal Act, Subdivision 6 (vi.) (addition by the Amendment Act of 1923)—"and fixing the minimum area and frontage of land upon which any building may be erected."

The minimum area and frontage upon which a house may be erected, at present laid down in By-law No. 100, are 25 perches and 40 feet. These dimensions require a depth of 257.8 links. Most of the allotments in the original town are 250 links in depth and those in the newer subdivisions are 200 links. Therefore the minimum frontage can hardly ever be used with the minimum area. They should be related to one another and form a standard home site of which general use can be made.

The first necessity is to decide whether the minimum frontage shall be fixed for residential allotments with or without rear access. Very few of the existing residential allotments have rear access, and that which has been provided lately, as pointed out under the heading of "Pathways" in the part of this report dealing with roads, do not provide rear access for vehicles. It is generally accepted that rear access is desirable for business sites, but not for residential allotments. The cost of upkeep is greater than the ratepayer can afford, and the benefits are not great enough to warrant it. It is strongly advised that in Mackay the Council should not require such secondary access for residential subdivisions.

The minimum frontage must therefore provide for a vehicle entrance beside the house.

The average width of a cottage in Mackay, when not cramped for room, is about 35 feet, and it must be at least three feet from the side fence.

Thus the minimum width required is 35 plus 10 plus 3, equals 48 feet. But it is advisable to set a standard into which the frontages generally existing can be divided without residue. A frontage of 75 links (49 feet 6 inches) fills these conditions while being very close to the minimum actually required. It is the frontage most generally adopted as a standard by Local Authorities in Queensland, and is recommended for adoption in Mackay.

The next thing to be considered before fixing a minimum area is the depth of allotment to which this minimum frontage will generally be applied. In Mackay most of the suburban portions which are likely to be subdivided for future residential sites are five chains wide. These can be subdivided by dedicating a road one chain wide, leaving allotments two chains in depth. This is also the depth used in most of the later existing subdivisions, and it is unlikely that many will be surveyed with a less depth. An allotment with a frontage of 75 links and a depth of 200 contains 24 perches, and it is recommended that this be adopted as the minimum area.

The following by-law is recommended to deal with area and frontage:—

“The minimum area that shall be permitted upon the subdivision or re-subdivision of land for residential purposes, in any one subdivision or parcel of such land shall be twenty-four perches, and not more than one house shall be erected or rebuilt upon any subdivision or parcel of such land.

The minimum frontage to a road or street, that shall be permitted for any subdivision or parcel of land to be used for residential purposes shall be 75 links, provided that where any such subdivision or parcel of land is bounded upon one side by the backs of two or more other subdivisions, it shall have a frontage of not less than 100 links; provided also that where subdivisions are of an uneven width from front to back, such as those fronting inwards on a curve, the minimum frontage may be applied to the mean width of the subdivision.”

Estates are planned and subdivided many years before they are fully settled, and under the present unsystematic methods the errors in their planning are only discovered when settlement takes place. It is too late then to make drastic alterations, and one of the objects of this plan is to avoid such errors at the time of subdivision.

The main errors are generally:—

1. Lack of co-ordination in the arrangement of subdivisional streets.
2. Lack of sufficient traffic routes, through there being no classification of roads.
3. The almost entire lack of park areas to serve the local population.

On the plan of development there are sufficient indications to prevent serious mistakes being made under the headings 1 and 2, and action should at once be taken by the Council to resume allotments in existing subdivisions where they are required to complete the road-system of the future.

In considering the method of subdivision of each estate, the Council has the power, amongst other things, to require the provision by the subdivider of sufficient space for public gardens and recreation. It is recommended that in all new subdivisions park space be required at the rate of about three acres per 100 allotments. The basis of estimation is that there will be 100 houses on 100 allotments, averaging 5.5 persons to the house, and so housing 550 people, who, at the rate of park space estimated in the section dealing with parks, would require about three acres of open space. Park spaces can at times be so placed that the contributions from three or four estates could be contiguous, forming one combined area large enough for all the forms of local recreation. On the other hand, if no park contribution is required from an owner, an arrangement should be made with him whereby, in lieu of land, he contributes, as his land is sold, an amount equal to the value of the land which would have been his park quota. This money should be deposited in a fund to compensate those owners who are required to dedicate larger areas of park towards any local recreational centre.

THE PLAN.

The plan, which has been compiled as a result of the investigations set out in this report, is drawn on a scale of eight chains to an inch, so that details shown on it can be transferred direct to the official plans of the City, prepared by the Survey Office. This being so, it was possible to dispense with the boundaries and numbers of allotments and subdivisions for the sake of clearness. In reproduction the scale has been reduced to 10 chains to an inch.

The plan illustrates all the decisions arrived at in the report, showing at the same time all existing uses as obtained from the Civic Survey. The effect of recommendations is thus at once discernable.

In a scheme of general development it is impossible to deal in detail with such matters as the layout of parks and of subdivisions. General principles only are indicated, and it will always be necessary to adapt these to conditions holding when the development takes place. The greatest detail has been indicated in the area over which future residential subdivisions should extend, and shows how each area may be subdivided as a whole. It may be necessary to modify these suggestions on account of the ownerships existing when the land is subdivided, but the general principles shown should be adhered to. The positions of parks and local business areas are suggestions only, illustrating their spacing to obtain maximum efficiency.

Many of the existing commercial and industrial uses are placed out of their zones by the zoning scheme. It is inevitable that this should be so, and it must be borne in mind that any re-organisation of existing conditions can only be a gradual process which must not impose undue hardship upon individuals. This is provided for in the section dealing with zoning. The commercial and industrial zones have been made compact and small, so as to avoid as far as possible the further blighting of areas at present mainly residential. It is strongly recommended that the zoning as set out on the plan be put into operation, that it be administered with sympathy and care to avoid victimisation, and that it be reviewed and modified if necessary after it has been in operation for a few years.

Every opportunity should be given the citizens to acquaint themselves with the scheme before it is enforced, and to lodge objections to it if they wish to. It will be found that most of the objections can be dealt with without materially affecting the scheme.

The report and plan have been prepared for use under existing legislation, but every effort should be made to obtain town planning legislation as outlined to the Council at the commencement of this work.