

URBAN TRANSPORT STUDY
IN
GREATER METROPOLITAN AREAS
OF
GEORGETOWN, BUTTERWORTH AND BUKIT MERTAJAM
MALAYSIA

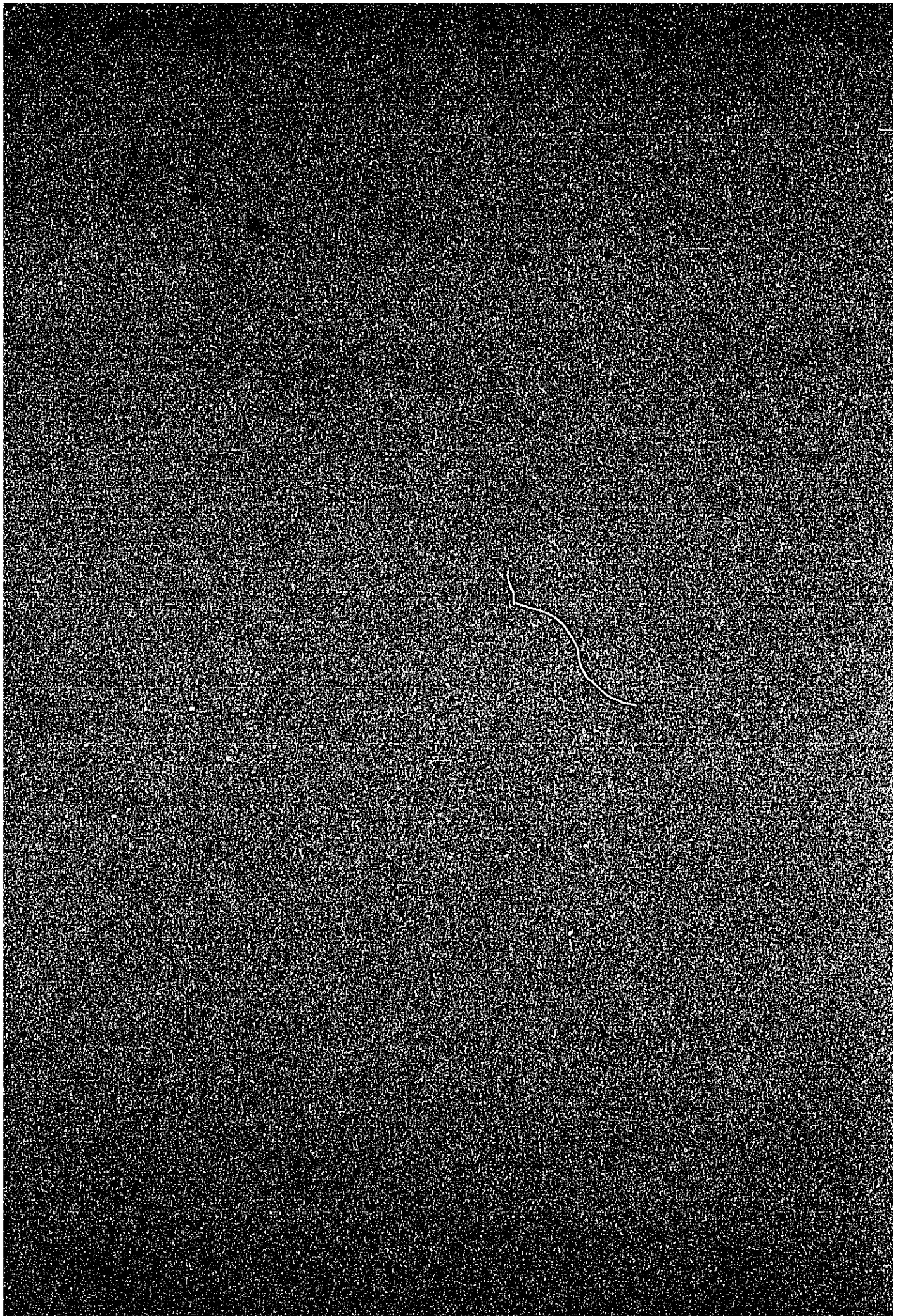
PARKING SURVEY

TECHNICAL REPORT — 06



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JAPAN INTERNATIONAL COOPERATION AGENCY



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PARKING SURVEY

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I

Introduction

I-I

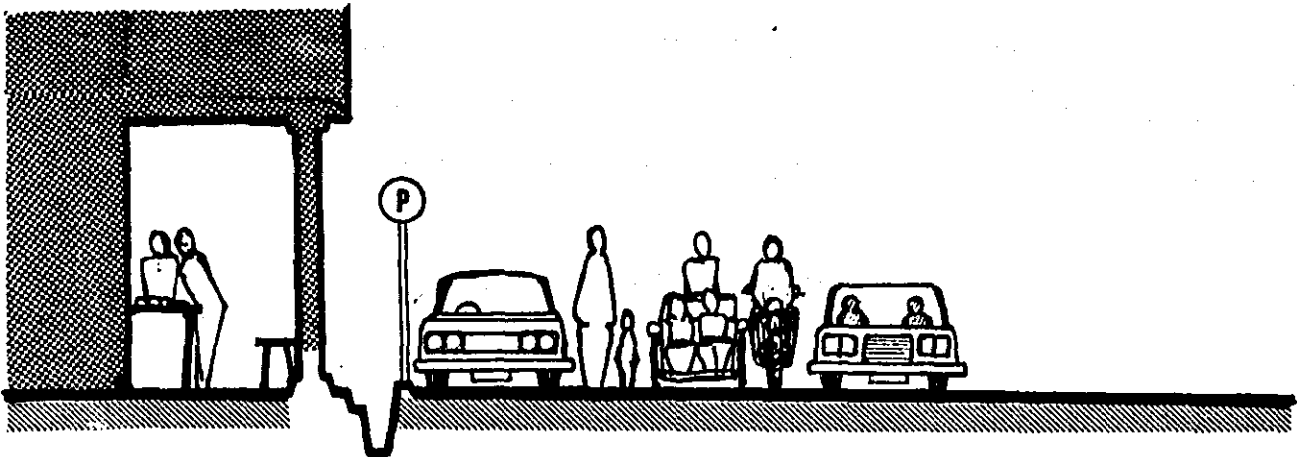
Parking Problems in Georgetown.

In the state of Penang, there are only a few streets where parking is prohibited and also there are only a few private parking lots that are charged. At present, there seems to be sufficient parking space on the streets to meet the existing demand for them such that drivers in Penang enjoy the full merit of using cars.

However, in the Central Business District of Georgetown, the traffic environment neither considers the welfare of pedestrians, there being scarcely any pedestrians walks, nor that of drivers, who have to tolerate narrow carriage-ways. Considering the ever-increasing traffic demand, the present system of parking will be one of the major obstacles for smooth-flowing and safe traffic.

Moreover, enough space for street parking has discouraged private sectors from developing off-street parking.

Fig.I: SKETCH OF A TYPICAL SECTION OF A STREET



I-2

Study Approach

a) Scope of the Study

This study focusses mainly on planning for future parking systems with a balance struck between control of street parking and the development of off-street parking according to the urban transport poling that will be formulated as follows. Therefore the following items are the basic guideline for the study.

- 1) To restrict street parking in order to provide sufficient space for side-walks and carriage-ways since it is almost impossible to widen the roads within the Central Business District.
- i) To encourage private sectors to develop off-street parking to meet the existing demand.
- iii) To forecast the future demand for parking space in the Central Business District according to the policy of restricting traffic flow into the Central Business District.

b) Objectives of the study.

Due to the above-mentioned points, the major objectives of this study for parking are:-

- i) To forecast the future demand for parking space.
- ii) To show the limitations and extent of future street parking.
- iii) To show the role of the private sector in the development of car-parks.

c) Flow Chart of the Study.

The flow-chart for this study is as follows:-

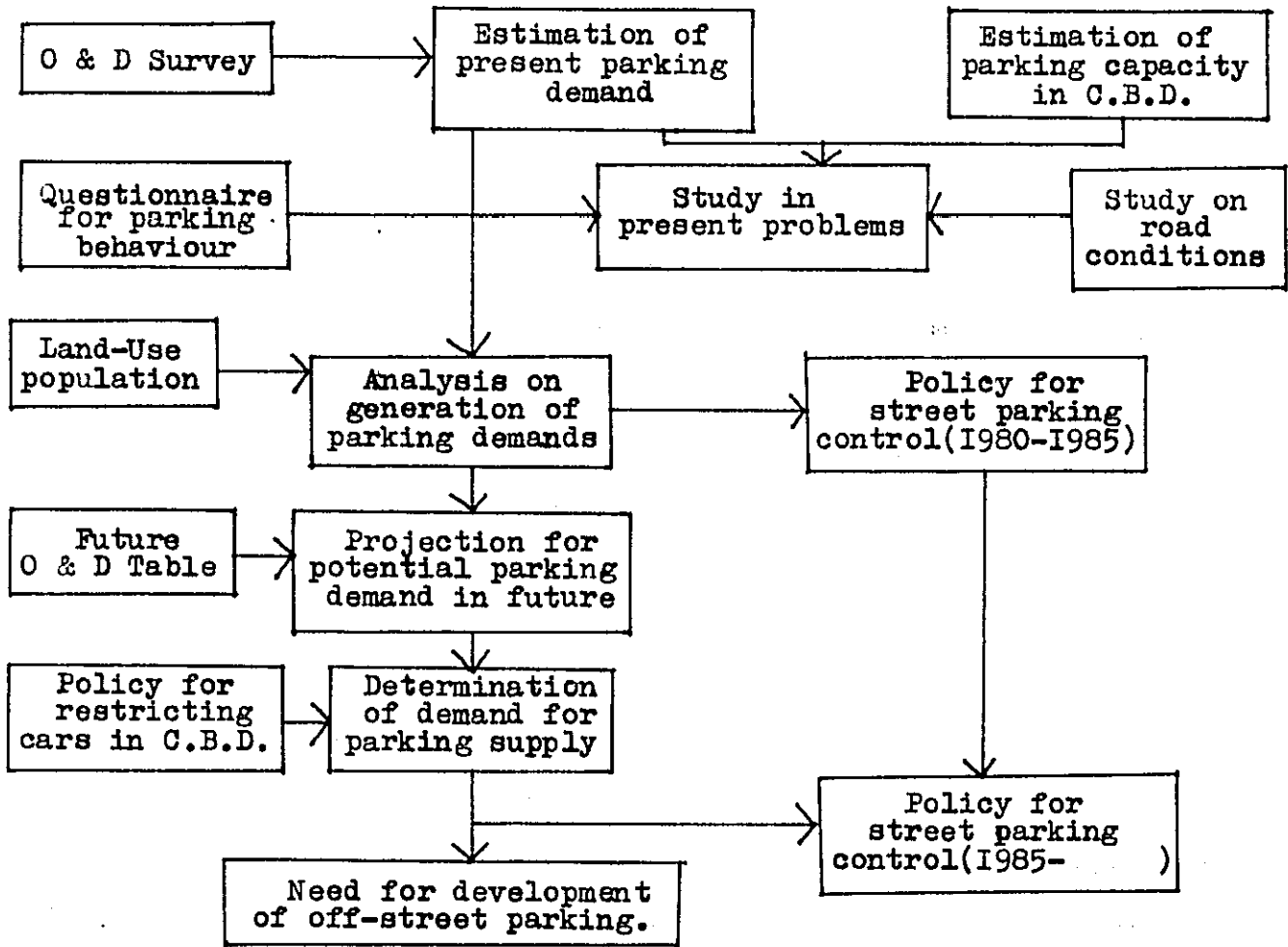


Fig.2 : THE FLOW CHART OF THE STUDY.

2 Present Conditions of Parking.

2.I Parking Control

a) Zone System of Georgetown.

At present, the charged parking zones of Georgetown is found mainly in the Central Business District. The charge is dependent on the importance of the area and the related land values. The zones are (see fig.3);

- i) AI and A2 : 30 cents per $\frac{1}{2}$ hr. for the first hour and 50 cents per $\frac{1}{2}$ hr. thereafter. No reservations are allowed in this zone.
- ii) BI and B2 : 20 cents per $\frac{1}{2}$ hr. for the first hour and 40 cents per hr. thereafter.
Reservations fees at \$80.00 per month.
Season tickets at \$70.00 per month.
- iii) CI, C2, C3, C4 and C5: 10 cents per $\frac{1}{2}$ hr. Reservations are allowed in this zone at \$50.00 per month. Season ticket is at \$30.00 per month.

b) Study on The Price of Parking.

In order to verify the correlation between the present parking rates and the land value, the basic parking rates have been calculated through a simple and theoretical assumption for all major roads in Georgetown, that falls within the charged parking zones(refer 2-I a)

PARKING RATES

(GEORGETOWN) FIG. 3

LEGEND:



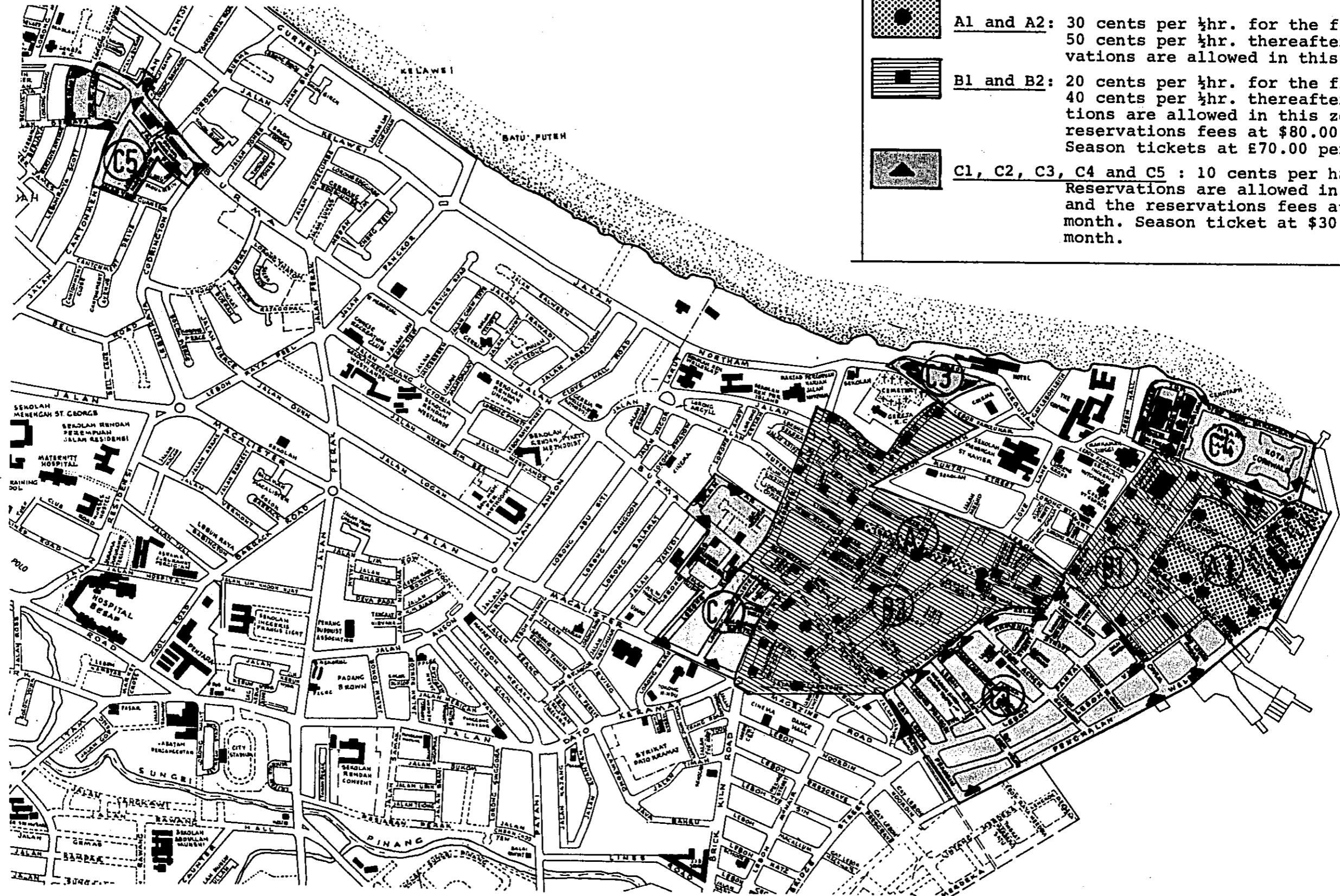
A1 and A2: 30 cents per ¼ hr. for the first hr. and 50 cents per ¼ hr. thereafter. No reservations are allowed in this zone.



B1 and B2: 20 cents per ¼ hr. for the first hr. and 40 cents per ¼ hr. thereafter. Reservations are allowed in this zone and the reservations fees at \$80.00 per month. Season tickets at £70.00 per month.



C1, C2, C3, C4 and C5: 10 cents per half hour. Reservations are allowed in this zone and the reservations fees at \$50.00 per month. Season ticket at \$30.00 per month.



The basic parking rates is obtained by multiplying the size of the parking lot(A) i.e 18'0'' by 8'0'' with the adjacent land value in dollars per square foot(\$psf). This value (\$A))is calculated over a period of one year and for twelve hours per day at a certain interest rate (I% , which includes operating cost and tax) on the land. Thus, the basic parking rates is obtained by;

$$\$A \times I\% \times \frac{I}{365} \times \frac{I}{12} \times 100 = x \text{ cents per hour.}$$

i) Case I:

Case I is the basic parking rate obtained at a 10% interest rate and this is shown in Table I (see Fig.4).

ii) Case II:

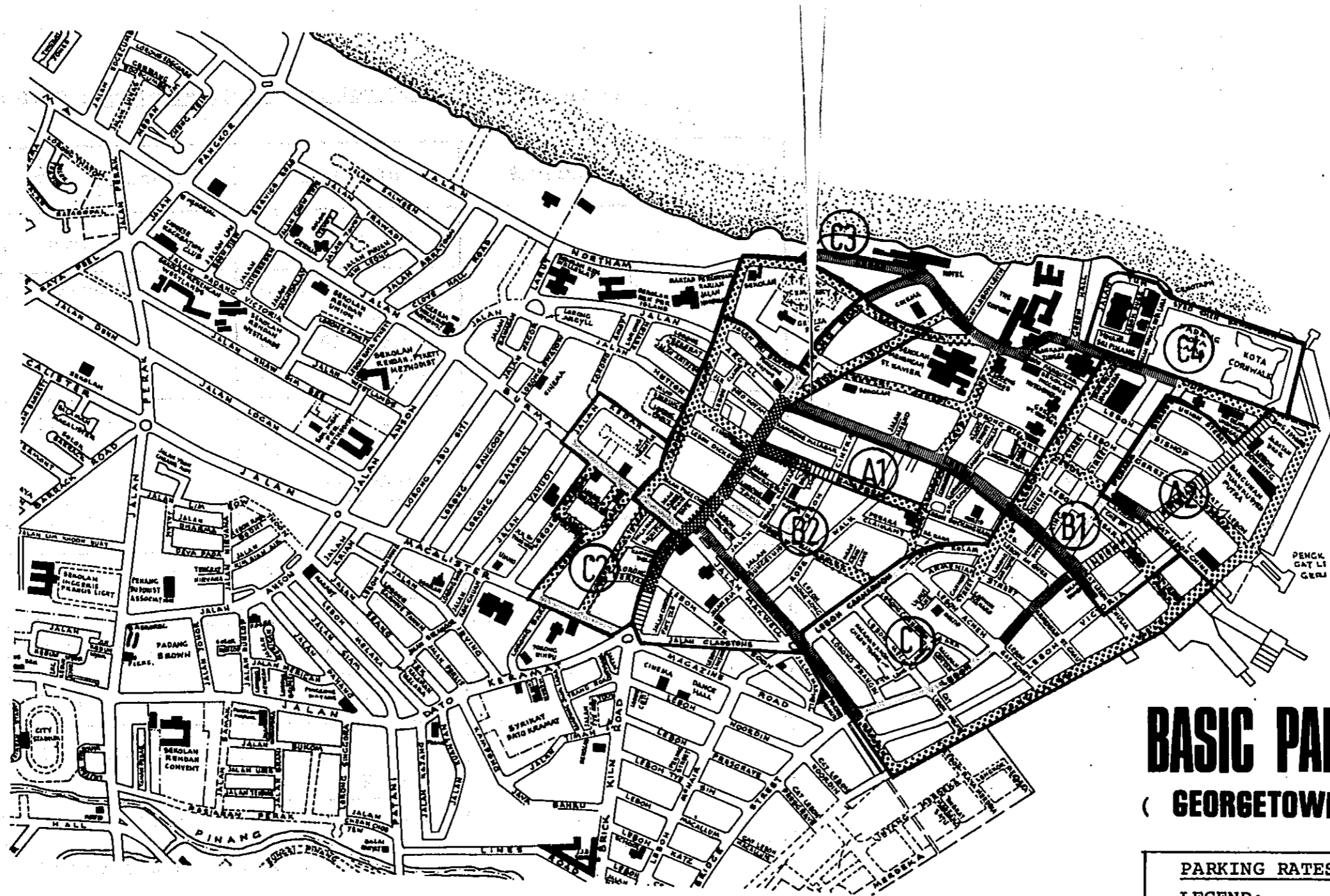
Case II is the basic parking rate obtained at a 15% interest rate and this is shown in Table 2 (see Fig,5).

Table I: BASIC PARKING RATE FOR GEORGETOWN : CASE I

Nane of Street:	Land Value	Parking Rates(per hr.)
I. Prangin Road	\$ 40 p.s.f.	15 ¢
2. Campbell Street	a. \$ 80 p.s.f. b. \$ 70 p.s.f. c. \$ 60 p.s.f. d. \$ 50 p.s.f.	30 ¢ 25 ¢ 20 ¢ 20 ¢
3. Beach Street	a. \$ 50 p.s.f. b. \$ 40 p.s.f. c. \$ 70 p.s.f.	20 ¢ 15 ¢ 25 ¢
4. Chulia Street	\$ 40 p.s.f.	15 ¢
5. China Street	a. \$ 25 p.s.f. b. \$ 40 p.s.f.	10 ¢ 15 ¢
6. China Str. Ghaut	\$ 25 p.s.f.	10 ¢
7. Hutton Lane	\$ 25 p.s.f.	10 ¢
8. Pitt Street	a. \$ 30 p.s.f. b. \$ 25 p.s.f.	10 ¢ 10 ¢
9. Penang Street	\$ 50 p.s.f.	20 ¢
10. Kimberly Street	a. \$ 60 p.s.f. b. \$ 50 p.s.f. c. \$ 30 p.s.f.	20 ¢ 20 ¢ 10 ¢
II. Light Street	a. \$ 40 p.s.f. b. \$ 25 p.s.f.	15 ¢ 10 ¢

contd/ ...

Name of Street	Land Value	Parking Rates(per hr.)
I2. Carnavon Street	a. \$ 50 p.s.f. b. \$ 30 p.s.f. c. \$ 25 p.s.f.	20 ¢ 10 ¢ 10¢¢
I3. Penang Road 66	a. \$ 80 p.s.f. b. \$ 70 p.s.f. c. \$ 50 p.s.f. d. \$ 40 p.s.f.	30 ¢ 25 ¢ 20 ¢ 15 ¢
I4. Macalister Road	\$ 25 p.s.f	20 ¢
I5. Burma Road	\$ 25 p.s.f.	20 ¢
I6. Argyll Road	\$ 25 p.s.f.	10 ¢
I7. Farquhar Street	\$ 25 p.s.f.	15 ¢
I8. Madras Lane	\$ 25 p.s.f.	10 ¢
I9. Kinta Lane	\$ 25 p.s.f.	10 ¢
20. Macalister Lane	\$ 25 p.s.f.	10 ¢
21. Transfer Road	\$ 30 p.s.f.	10 ¢
22. Weld Quay	\$ 30 p.s.f.	10 ¢



BASIC PARKING RATES

(GEORGETOWN) FIG. 4

PARKING RATES AT 10% INTEREST.

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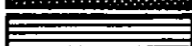



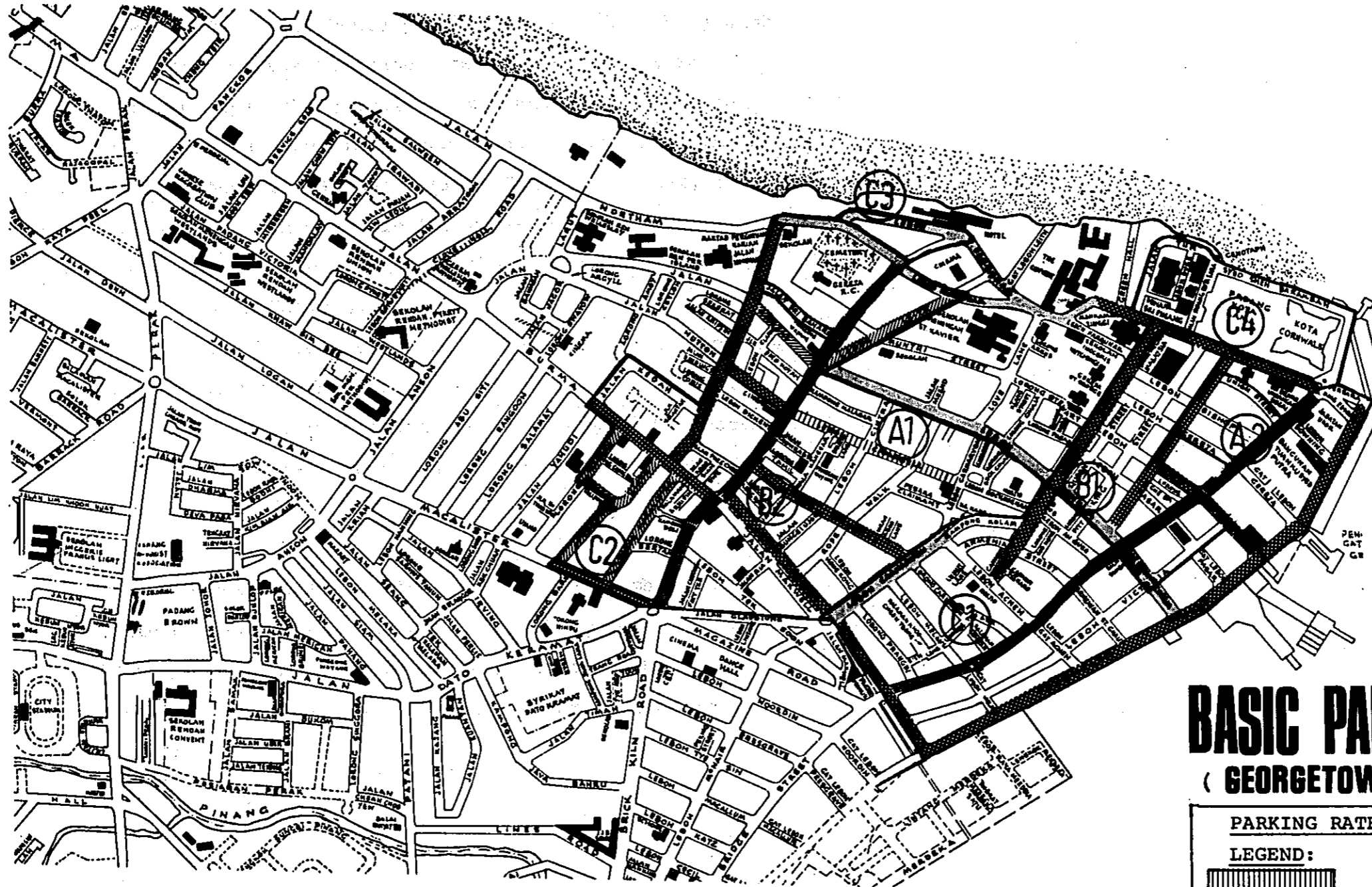
	30 cents per hr.
	25 cents per hr.
	20 cents per hr.
	15 cents per hr.
	10 cents per hr.

Table 2 : Basic Parking Rates for Georgetown : Case II

Name of Street:	Land Value	Parking Rates (per hr.)
I. Prangin Road	\$ 40 p.s.f.	25 ¢
2. Campbell Street	a. \$ 80 p.s.f. b. \$ 70 p.s.f. c. \$ 60 p.s.f. d. \$ 50 p.s.f.	45 ¢ 40 ¢ 35 ¢ 30 ¢
3. Beach Street	a. \$ 50 p.s.f. b. \$ 40 p.s.f. c. \$ 70 p.s.f.	30 ¢ 25 ¢ 40 ¢
4. Chulia Street	\$ 40 p.s.f.	25 ¢
5. China Street	a. \$ 25 p.s.f. b. \$ 40 p.a.f.	15 ¢ 25 ¢
6. China Str. Ghaut	\$ 25 p.s.f.	20 ¢
7. Hutton Lane	\$ 25 p.s.f.	20 ¢
8. Pitt Street	a. \$ 30 p.s.f. b. \$ 25 p.s.f.	20 ¢ 20 ¢
9. Penang Street	\$ 50 p.s.f.	30 ¢
10. Kimberly Street	a. \$ 60 p.s.f. b. \$ 50 p.s.f. c. \$ 30 p.s.f.	35 ¢ 30 ¢ 20 ¢
II. Light Street	a. \$ 40 p.s.f. b. \$ 25 p.s.f.	25 ¢ 15 ¢
12. Carnavon Street	a. \$ 50 p.s.f. b. \$ 30 p.s.f. c. \$ 25 p.s.f.	30 ¢ 20 ¢ 15 ¢

contd/

Name of Street	Land Value	Parking Rates(per hr.)
I3. Penang Road	a. \$ 80 p.s.f. b. \$ 70 p.s.f. c. \$ 50 p.s.f. d. \$ 40 p.s.f.	45 ¢ 40 ¢ 30 ¢ 25 ¢
I4. Macalister Road	\$ 50 p.s.f.	30 ¢
I5. Burma Road	\$ 50 p.s.f.	30 ¢
I6. Argyll Road	\$ 25 p.s.f.	15 ¢
I7. Farquhar Street	\$ 40 p.s.f.	25 ¢
I8. Madras Lane	\$ 25 p.s.f.	15 ¢
I9. Kinta Lane	\$ 25 p.s.f.	15 ¢
20. Macalister Lane	\$ 25 p.s.f.	15 ¢
21. Transfer Road	\$ 30 p.s.f.	20 ¢
22. Weld Quay	\$ 30 p.s.f.	20 ¢









BASIC PARKING RATES

(GEORGETOWN) FIG. 5

PARKING RATES AT 15% INTEREST.

LEGEND:

	40 cents per hr.
	35 cents per hr.
	30 cents per hr.
	25 cents per hr.
	20 cents per hr.
	15 cents per hr.

iii) Analysis of Results

For the analysis of the results, we make a comparison of the basic parking rates (Case II) with the existing parking rate (see Table 3). It is observed that the existing rates charged for parking for the first hour is either equal to or more than the basic rates, for example. along Campbell Street, it is charged more than double the basic rate whereas at Burma Road, it is charged at the same rate. This is tabulated in Table 4.

As the basic parking rate does not include the space of the carriage-way for the vehicle which intends to park, the parking rate will be higher than the present basic parking rate when actual development is carried out.

Therefore, taking the limitations of this survey into consideration, the present parking rate of Georgetown is considered to be so moderate that the private sector should not be discouraged from developing parking space.

Table 3: Comparison of Basic and Existing Parking Rates.

Name of Street	Basic Parking Rates (per hr.)	Basic Parking Rates (per hr.)
I. Prangin Road	25 ¢	40 ¢
2. Campbell Street	45 ¢	60 ¢
3. Beach Street	35 ¢	40 ¢
4. Chulia Street	25 ¢	60 ¢
5. China Street	20 ¢	60 ¢
6. China Street Ghaut	20 ¢	60 ¢
7. Hutton Lane	20 ¢	40 ¢
8. Pitt Street	20 ¢	40 ¢
9. Penang Street	30 ¢	60 ¢
10. Kimberly Street	30 ¢	40 ¢
II. Light Street	20 ¢	20 ¢
12. Carnavom Street	25 ¢	20 ¢
13. Penang Road	25 ¢	40 ¢
14. Macalister Road	30 ¢	20 ¢
15. Burma Road	30 ¢	20 ¢
16. Argyll Road	15 ¢	20 ¢
17. Farquahar Street	25 ¢	20 ¢
18. Madras Lane	15 ¢	20 ¢
19. Kinta Lane	15 ¢	20 ¢
20. Macalister Lane	15 ¢	20 ¢
21. Transfer Road	20 ¢	20 ¢
22. Weld Quay	20 ¢	20 ¢

Table 4 : Analysis of Basic and Existing Parking Rates.

Name of Street:	Analysis
I. Carnovon Street 2. Macalister Road 3. Burma Road 4. Farquhar Street	Undercharged
5. Beach Street 6. Chulia Street 7. China Street 8. China Street Ghaut 9. Kimberly Street IO. Penang ROad II. Argyll Road I2. Madras Lane I3. Kinta Lane I4. Macalister Lane	Charged at same amount or less than double the basic rate.
I5. Prangin Road I6. Hutton Lane I7, Pitt STreet I8. Penang Street I9. Light Street 20. Transfer Road 2I. Weld Quay	Charged at double the basic rate
22. Campbell Street	More than double the basic rate

c) Development Control:

i) By-Laws

With reference to the By-Laws With Respect To Buildings and New Streets of the City Council of Georgetown, Penang (Third Schedule, page 66), there is a minimum standard for off-street parking requirements as shown in Table 5.

Most of the private parking located in the Central Business District of Georgetown has been developed following the requirements of the By-Laws but these seem seemed to fall short of the complete enforcement of the law.

Private owners of vehicles are not restricted from building their own garage for their own use.

ii) Multi-Storey Car-Park Zoning

Within the Central Business District of Georgetown, the zoning for multi-storey car-park is proposed in order to meet the parking demand, but none of them have been studied and designed in detail yet (see Fig.6).

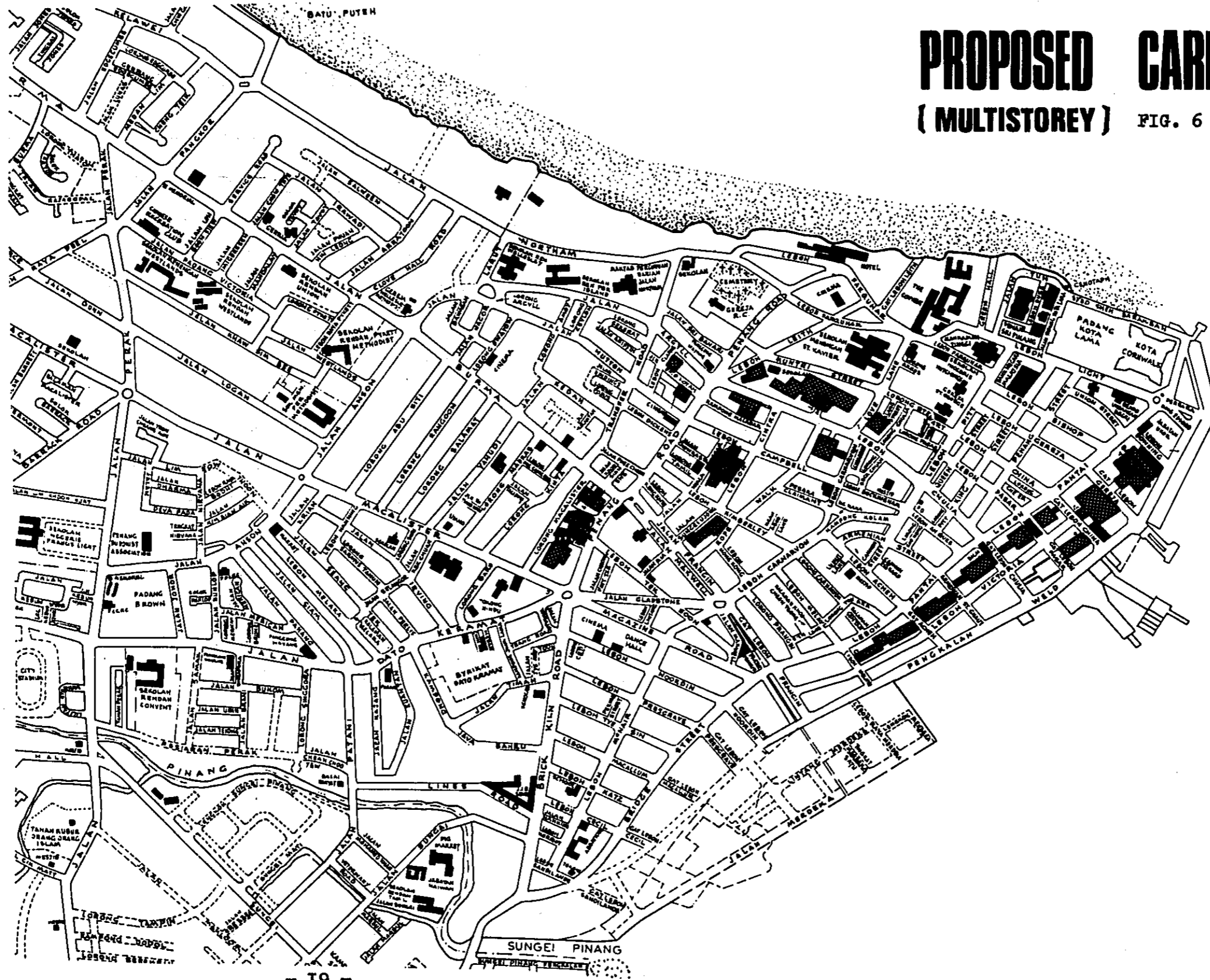
If all of these zones are developed, the total capacity of car-parks will be about 6,500 units with the plot ratio of 300%. As these zones are located at the vicinity of the Port of Penang and the commercial area (Central), they will be effective in absorbing the parking demands if completely developed.

Table 5: Minimum Standards for Off-Street Parking Requirements

<p>Cinemas and Theatres</p>	<p>(i) Capacity I,000 seats and below: 200 sq.ft. to every 15 seats plus 10% of the above area for motor-cycles and bicycles i.e 220 sq.ft. for every 15 seats. (ii) Additional seats above I,000: 200 sq.ft. to every 10 seats plus 10% of the above area fo motor-cycles and bicycles i.e 220 sq.ft. for every 10 seats.</p>
<p>Auditoria and Recreational establishmen s e.g clubs churches, restaurants.</p>	<p>200 sq.ft. to every 20 visitors at peak periods plus 10% of the above area for motorcycles and bicycles i.e 220 sq.ft. for every 20 visitors.</p>
<p>Hotels</p>	<p>200 sq.ft. for every 3 bedrooms or suites.</p>
<p>Flats, frre standing blocks (not applicable to low-cost housing).</p>	<p>200 sq.ft. for every dwelling unit.</p>
<p>Commercial premises and office blocks (shops having a floor space of less than 300 sq.ft. used as and in connection with the shop exempted).</p>	<p>200 sq.ft. for every 1000 sq.ft. of floor area plus 10% of above for motorcycles and bicycles i.e 220 sq.ft. for every 1,000 sq.ft. In the case of commercial buildings other than office blocks, additional provision shall be made for off-street delivery to and unloading of goods from the premises as directed by the Council.</p>

<p>Industrial Buildings</p>	<p>200 sq.ft. for every 1,00 sq.ft. of built-up area plus 10% of above area for motorcycles and bicycles i.e 220 sq.ft. for every 1,000 sq. ft.</p>
<p>Primary and Secondary Schools</p>	<p>200 sq.ft. per 2 staff and casual parking space for a minimum of 20 cars i.e 4,000 sq.ft. for schools having an enrolment up to 500; for every additional 100 students at a rate of 1,000 sq.ft. per 100 students. Adequate provision of cycle park to be provided in addition as directed by the Council.</p>
<p>Further Education e.g Teachers Training College</p>	<p>200 sq.ft. per each staff member and 200 sq.ft. per 6 students.</p>

PROPOSED CARPARK ZONES (MULTISTOREY) FIG. 6



Parking Capacity of Central Business Districta) Street Parkingi) Charged On-Street Parking

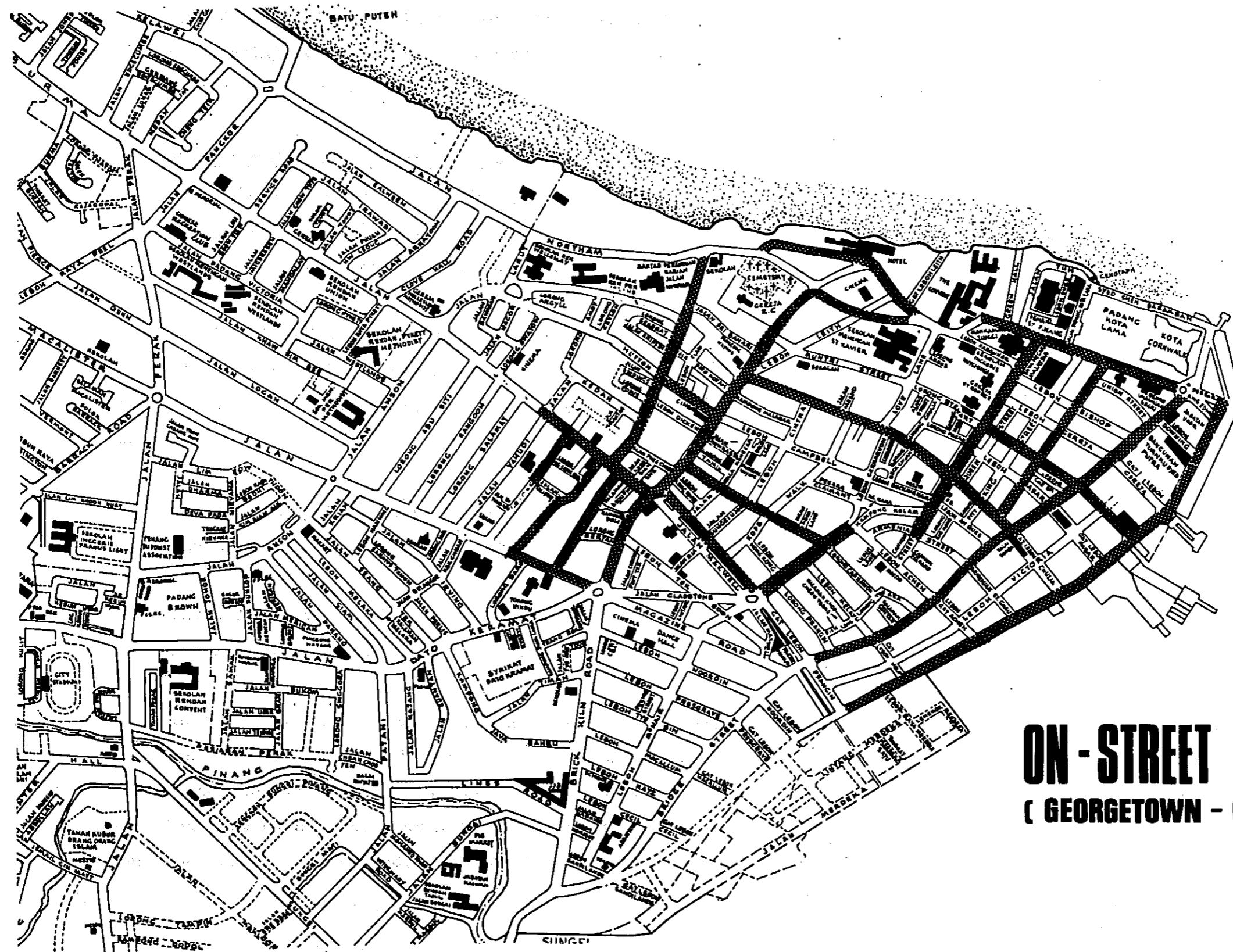
The present on-street for Georgetown that is being charged according to the charged parking zones is limited to certain roads in the Central Business District (refer to Fig.3). These on-street parking include parking spaces for motorcars, motorcycles, bicycles, trishaws, and also lay-bys for buses. The total capacity of charged on-street parking spaces is shown in Table 6. Thus, the total parking capacity for the various vehicles are as follows;

a. Cars	: 690 units
b. Motorcycles and bicycles:	13,570 sq.ft.
c. Trishaws	: 1,848 sq.ft.

At present, only cars using these parking spaces are being charged by the City Council (refer Fig.7)

Table 6: Total Capacity of On-Street Parking (Charged)

Name of Street	Cars(unit)	Motorcycles/Bicycles (sq.ft.)	Trishaws (sq.ft.)
I. Penang Road	112	980	-
2. Beach Street	71	-	-
3. Kimberly Street	97	1,026	208
4. China Street	44	608	-
5. China Str, Ghaut	44	764	-
6. Prangin Road	23	1,264	-
7. Carnavon Street	33	1,408	624
8. Hutton Lane	40	864	-
9. Campbell Street	66	4,144	120
10. Pitt Street	63	1,488	-
11. Chulia Street	97	1,024	896
12. Northam Road	-	-	-
Total:	690	13,570	1,848



ON-STREET PARKING
 (GEORGETOWN - CHARGED) FIG. 7

ii) Free On-Street Parking

In addition to the on-street parking charged by the City Council, it is also possible to park along the streets of the Central Business District outside the charged parking zone. The present conditions of on-street parking is shown in Fig. 8.

Procedure for Calculation of Free On-Street Parking

The calculation for on-street parking is tabulated in Table 6. The Central Business District is divided into seven zones (see Fig. 9) and the calculations are made accordingly.

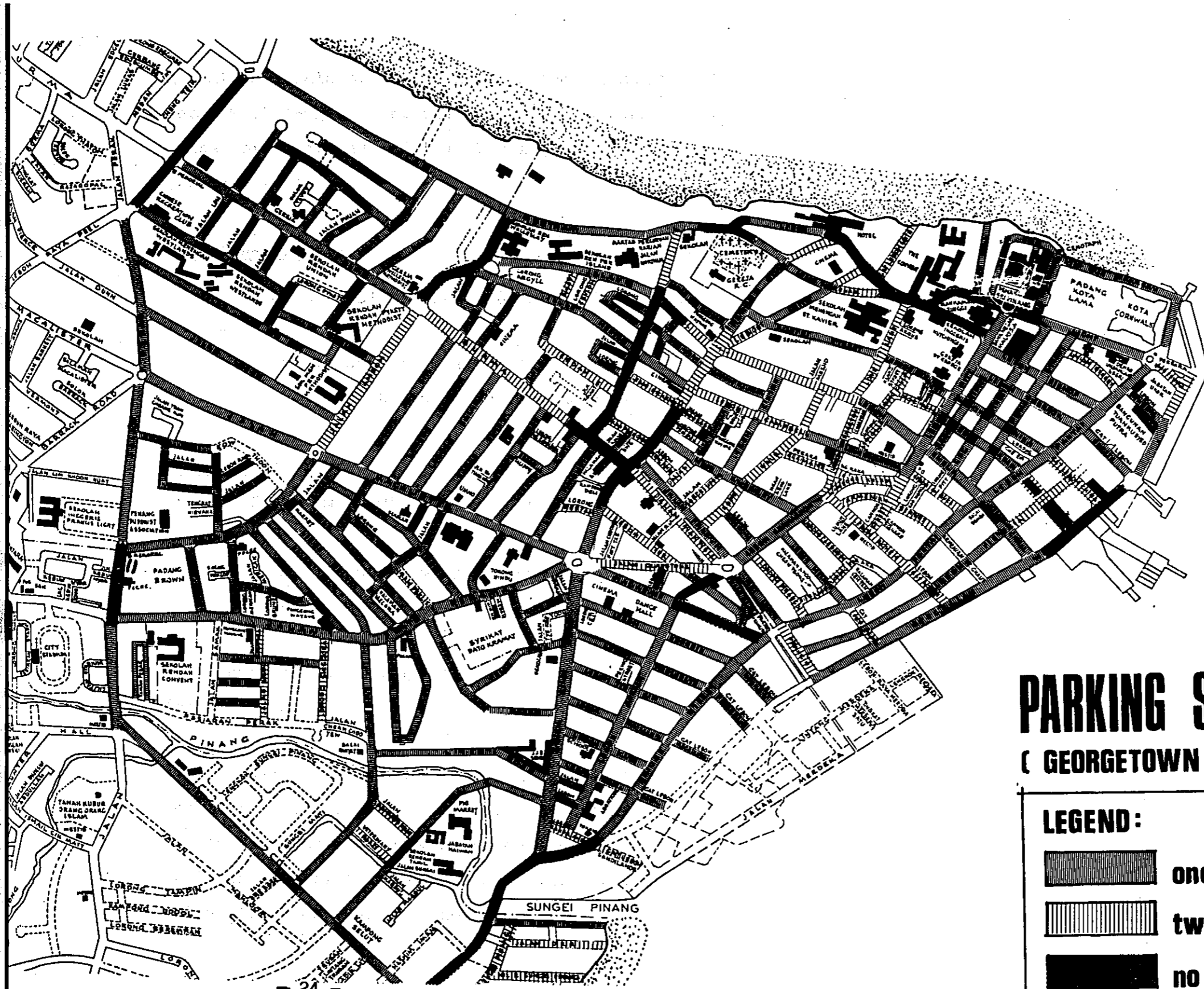
In the first stage, the total length of the street (A) is measured. If it is one side parking, the length (A) is retained, and if it is a two-side, the length is doubled i.e

One side parking: $A \text{ ft.} \times 1 = A \text{ ft.}$

Two side parking: $A \text{ ft.} \times 2 = 2A \text{ ft.}$

Thus, A ft. and 2A ft. is the total kerb length for one-side and two-side parking respectively.




In the second stage, we make deductions for junctions accesses and ' No Parking ' signs. For each junction along a particular road, a minimum length of 30 ft. is deducted from each side, thus a total of 60 ft. for a junction. On the other hand, for each ' No Parking ' sign



PARKING SURVEY

(GEORGETOWN) FIG. 8

LEGEND:

-  one side parking
-  two side parking
-  no parking

a maximum length of 50 ft. is deducted. Therefore, the total kerb length A ft. and 2A ft. is reduced by the number of junctions and ' No Parking ' signs that are present. Thus,

One side-parking:

$$A \text{ ft} - m (60' 0'') - n (50' 0'') = A_x \text{ ft.}$$

where,

m : number of junctions

n : number of ' No Parking ' signs.

Two side parking:

$$2A \text{ ft.} - m (60' 0'') - n (50' 0'') = A_y \text{ ft.}$$

where,

m : number of junctions

n : Number of ' No Parking ' signs.

Thus, A_x ft. and A_y ft. is the Nett Parkable length for each street.

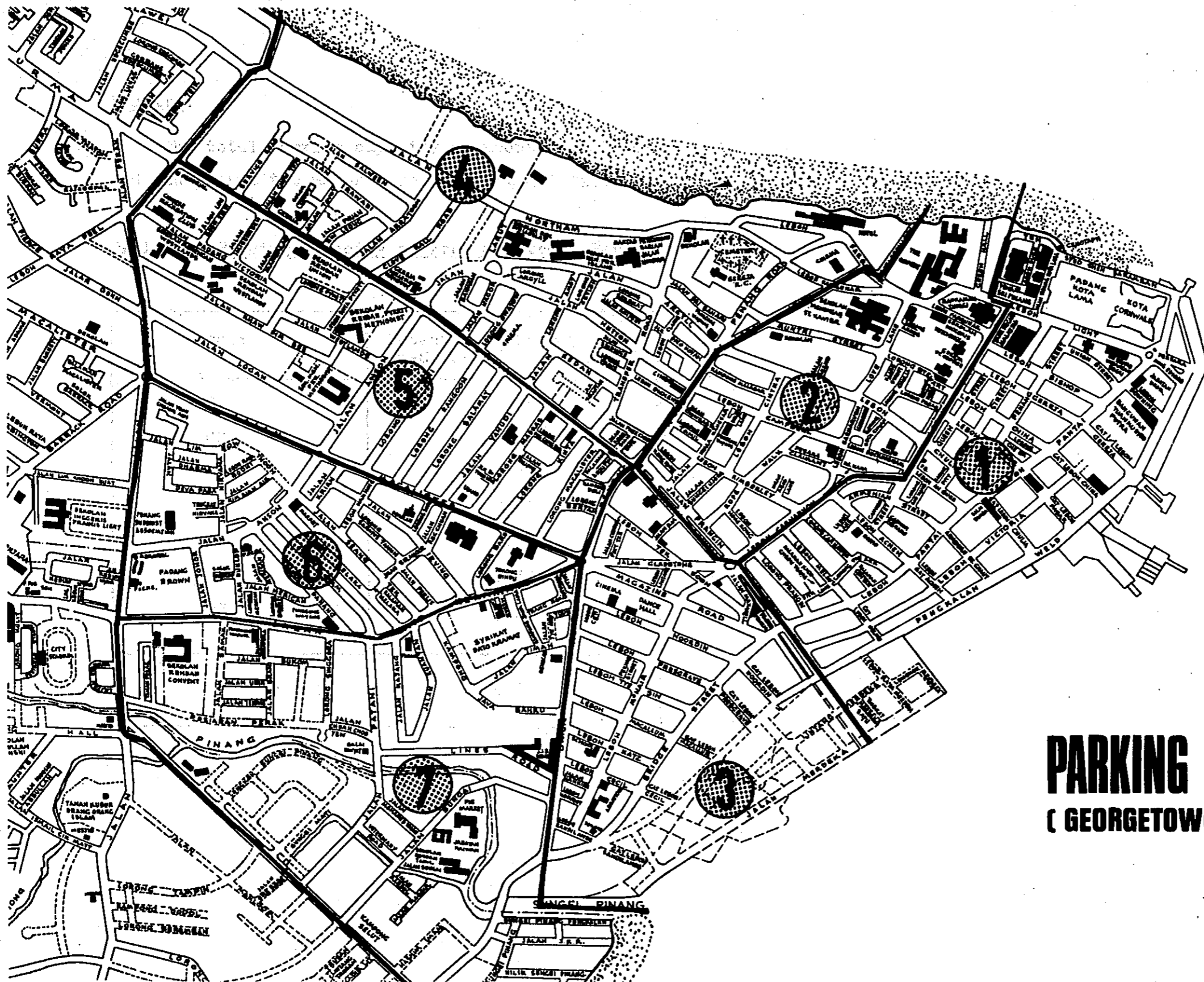
Finally, this Nett Parkable length is divided by the length of the parking bar i.e 18' 0'' and thus, we obtain the number of parking spaces in the Central Business District for each street and zone. The calculation for these is shown in Table 3.

TABLE: 7

CALCULATION OF FREE ON-STREET PARKING.

ZONE: _____

STREET NAME	LENGTH (ft.)	PARKING ONE OR TWO SIDE.	TOTAL KERB LENGTH (ft)	LENGTH FOR JUNCTION AND "NO PARKING" SIGNS.	NETT PARKABLE LENGTH (ft.)	POTENTIAL NO. OF PARKING SPACES
TOTAL:						



PARKING ZONES
 (GEORGETOWN) FIG. 9

Results:

The total parking capacity is about 16,000 units and thus forms the major type of parking. (Table 8)

Table 8 : Parking Capacity of Free On-Street Parking

Zone:	Potential Capacity of On-Street Parking (unit).
01	3,662
02	1,343
03	1,830
04	2,836
05	2,393
06	2,112
07	2,506
Total:	16,682

See Appendix I

b) Off-Street Parking

i) Public Off-Street Parking

The present public off-street parking is limited to the Central Business District (see Fig. 10). These parking spaces are mainly for cars and motorcycles. The capacity for public off-street parking in the various zone is shown in Table 9 and the total capacity of car-parks recorded is 679 units and of motorcycles is 243 units.

Table 9 : Off-Street Parking (Public) Capacity

Area:	Number of Carparks	Number of Motor-cycle parks.
1. Union Street	105	58
2. Market Street Ghaut.	37	6
3. Fort Cornwallis	208	-
4. Cintra Street	40	-
5. Hutton Lane	36	-
6. Kedah Lane	200	179
7. Prangin Road	34	-
8. Great World Park.	17	-
Total:	679	243

ii) Private Off-Street Parking

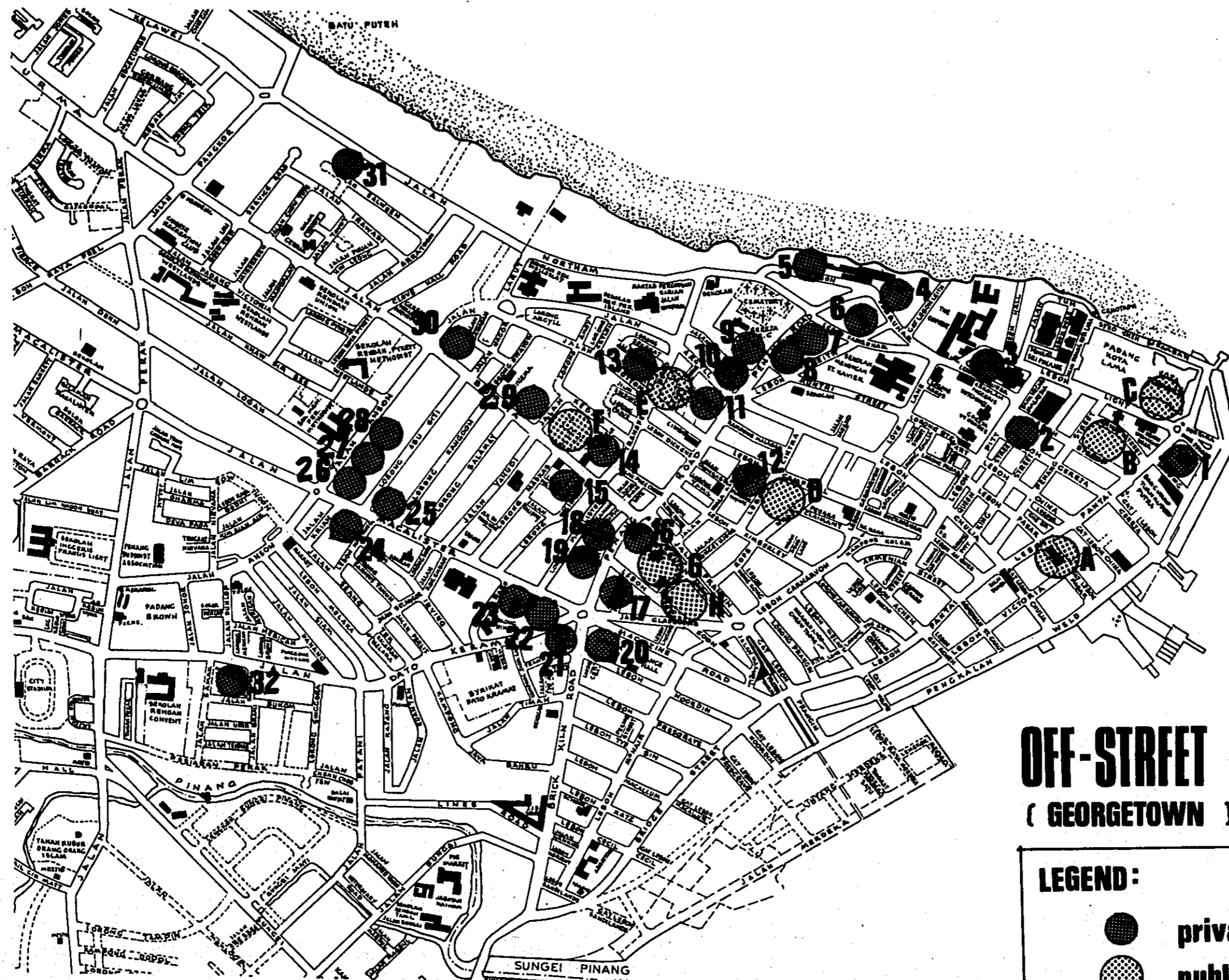
In accordance with the By-Laws, the private sector includes Hotels, Restaurants, Public Buildings and shopping centres and they provide their own parking space.(see Fig.10). Some have adequate parking spaces while others do not. The total capacity of private off-street parking is 1,534 units(Table 10).

c) The Present Parking Capacity of the Central Business District.

The total capacity in the present situation is made up of the following;

On-Street Parking	:	Charged On-Street Parking
(16,682 units)		(690 units)
	:	Free On-Street Parking
		(15,992 units)
Off-Street Parking	:	Public Off-Street Parking
(2,213 units)		(679 units)
	:	Private Off-Street Parking
		(1,534 units)

Therefore, 18,893 units of parking space are provided for in the Central Business District of Georgetown and about 85% of this is free on-street parking; which not only aggravates the already busy traffic flow but also jeopardize the safety of road-users/. The parking capacity is shown in Fig. II.



OFF-STREET PARKING
 (GEORGETOWN) FIG. 10

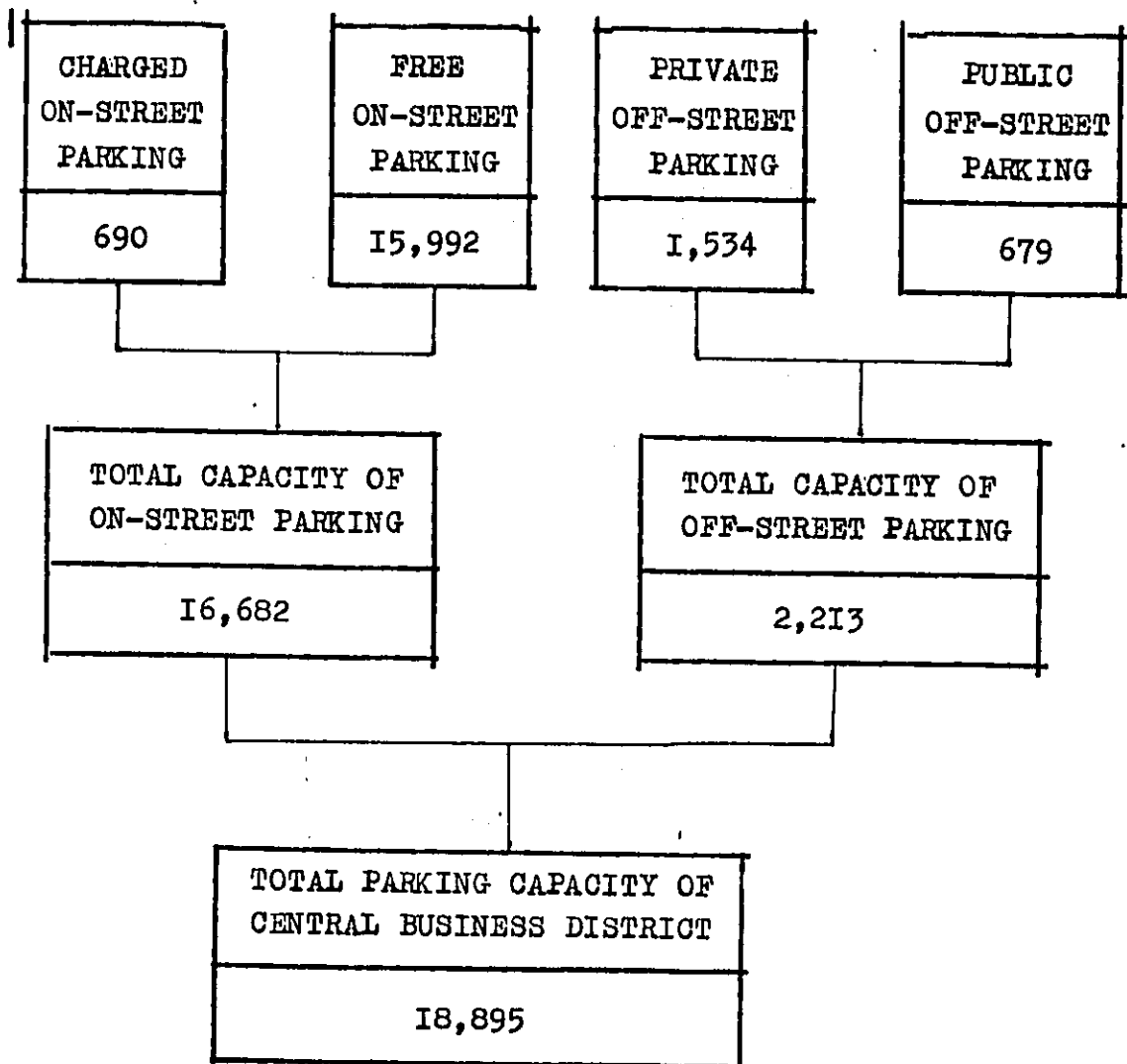
LEGEND :

- private
- public

TABLE IO: Off-Street Parking (Private)

<u>ZONE:</u>	<u>NUMBER OF CARPARK</u>
1. Bangunan Syed Putra	240
2. A.I.A. Building	31
3. High Court	50
4. E&O Hotel	88
5. Penang Bowl	40
6. Merlin Hotel	85
7. Continental Hotel	30
8. Malaysia Hotel	40
9. Peking Hotel	20
10. Odeon Theatre	28
11. Town House	45
12. Sun Theatre	48
13. Junior's Restaurant	20
14. Rex Theatre	60
15. Singapore Hotel	9
16. Komtar	75
17. Hotel Central	52
18. Hotel Fortuna	14
19. People's Park	41
20. Wisma Central	61
21. Savoy's Bowl	27
22. Mandarin Room	83
23. Garden Inn	50
24. Fortuna Restaurant	150
25. Haloman Restaurant	20
26. Pacific Centre	20
27. Federal Theatre	65
28. Proposed Chinese Town Hall	20
29. Ferry Terminal	87
TOTAL	1,534

Fig. II: THE PRESENT PARKING CAPACITY OF THE CENTRAL BUSINESS DISTRICT.



Of the 16,682 units of free on-street parking, we divided them into two categories viz by the width of the road i.e more than forty feet and less than forty feet. This will help us in our parking proposals. The total number of free on street parking by the categories above is shown in Table II.

Table II: FREE ON-STREET PARKING BY WIDTH OF ROAD

ZONE	NUMBER OF PARKING SPACES	
	more than 40ft.	Less than 40 ft.
01	2,371	1,291
02	381	962
03	737	1,093
04	1,421	1,415
05	823	1,570
06	940	1,172
07	1,135	1,371
TOTAL:	7,808	8,874

See Appendix II

The Potential Parking Capacity

In addition to the present parking capacity, we have considered two types of parking spaces as a potential source for parking demand. The first is the parking spaces along the streets which at present prohibits parking and the other is the proposed area which is zoned for the multi-storey carpark.

Surplus on-street parking : 1,977 units
(see Table I2)

Multi-storey carparks : 6,500 units
(refer section 2.2 c)

Table I2 : SURPLUS NUMBER OF CARPARKS

Zone	one or two side parking	Potential number of carpark
I. Weld Quay	2	117
2. Market Street Ghaut	1	35
3. Light Street	2	117
4. Farquhar Street	2	211
5. Magazine Road	2	217
6. McNair Road	2	59
7. Penang Road	2	141
8. Burmah Road	2	76
9. Transfer Road	1	188
10. Argyll Road	2	35
11. Northam Road	2	59
12. Larut Road	2	141
13. Pangkor Road	2	194
14. Perak Road	2	94
15. Jelutong Road	2	293
I		
Total:		1,977

4 Questionnaires on Parking Behaviour.
4-1 Questionnaires to drivers.

a) Purpose of the Survey.

This survey will provide some basic information on the behaviour of drivers with respect to parking. This information is also obtained from the Owner Interview survey. This survey is therefore, a supplement to it.

b) Procedure of the Survey.

(i) Survey Method.

Owners of vehicles who were about to park their vehicles in the parking bay were interviewed.

(ii) Survey Stations and Number of Samples.

On the whole 384 samples were collected from 16 stations situated at the major roads of George Town, Butterworth and Bukit Mertajam (shown in Table 13 and Figure 12).

TABLE 13 LOCATION OF SURVEY STATIONS AND NO. OF SAMPLES.

DATE	STATION NO:	NAME OF STREETS	NO: OF SAMPLES COLLECTED
<u>GEORGETOWN</u>			
21/05/79	1.	Lebuh Pantai	25
	2.	Campbell Street	25
	3.	Lebuh Pitt	25
	4.	Lebuh Chulia	25
	5.	Lebuh Carnavon	25
22/05/79	6.	Lebuh Kimberley	25
	7.	Jalan Northam	15
	8.	Lebuh Light	25
Subtotal			190
<u>BUTTERWORTH</u>			
21/05/79	9.	Jln. Kg. Bengali	25
	10.	Jalan Kg. Gajah	22
	11.	Railway Terminal	25
	12.	Chain Ferry Road	24
Subtotal			96
<u>BUKIT MERTA JAM</u>			
22/05/79	13.	Jln. Arumugam Pillai	25
	14.	Jalan Pasar	23
	15.	Jalan Besar	25
	16.	Jalan Aston	25
Subtotal			98
TOTAL			384 =====

Samples were collected by type of vehicle i.e. 225 motorcars 48 vans and pick-ups, 25 lorries and 86 motorcycles. The next table shows some data on these samples by time and by changing rates.

TABLE 14 TYPE OF SAMPLE

VEHICLES	NUMBERS	PERCENTAGE	AM	PM	CHARGED	FREE
1. MOTOR CARS	225	58.6	150	75	121	104
2. VAN & PICK-UP	48	12.5	34	14	19	29
3. LORRIES	25	6.5	14	11	6	19
4. MOTOR CYCLES	86	22.4	49	37	17	69
TOTAL	384	100.00	247	137	163	221

The period of time for the survey was divided into two, i.e. one in the morning (8.30 a.m. - 10.00 a.m.) and one in the afternoon (1.00 p.m. - 3.30 p.m.)

iii) Questionnaire Administration.

Since it was necessary to obtain the cooperation of drivers regarding the questionnaires, only few and simple questions were included. These are:-

TABLE 15 QUESTIONAIRES FOR PARKING CHARACTERISTICS.

Survey Station	Time	Date	Type of Vehicle	Name of Surveyer	Name of Supervisor
No. Sheet Name					
<input type="checkbox"/> Charged <input type="checkbox"/> Free	1. Motor Car 2. Van & Pick-up. 2. Lorries 4. Motor Cycles.				

1. What is your major purpose to park here?

-
1. Going to work
 2. Business Engagement
 3. Shopping/Marketing
 4. For Food/Entertainment
 5. School
 6. Social Visit
 7. Goods & Freight Delivery
 8. Others.

2. How many yards or minutes are you going to walk to reach your destination?

yards or minutes.

3. How long do you intend to park here?

-
1. less than 30 min.
 2. 31 min. - 1 hour
 3. 1 hour - 3 hour
 4. 3 hour - 5 hour
 5. 5 hour - 8 hour
 6. 8 hour -

4. Where is your residence?

5. Where do you park your car at night time?

-
1. Garage of your residence.
 2. Vacant Land
 3. Street Parking
 4. Charged Car Parks.

c) Results of the Survey.

(i) Purpose of Parking.

The responses to the question of purposes of parking are tabulated as follows.

TABLE 16 PARKING PURPOSE

PURPOSE	NO. OF VEHICLES	PERCENTAGE
1. GOING TO WORK	65	16.9
2. BUSINESS ENGAGEMENT	103	26.8
3. SHOPPING/MARKETING	61	15.9
4. FOR FOOD/ENTERTAINMENT	39	10.2
5. SCHOOL	1	0.3
6. SOCIAL VISIT	29	7.6
7. GOODS & FREIGHT DELIVERY	50	13.0
8. OTHERS	36	9.4
TOTAL	384	100.0

It has been found that most of the drivers used parking for business engagements and for going to work as the percentage for such purposes was 26.8% and 16.9%. Very few school staff i.e. teachers, used public parking lot. This could be because they were provided with parking bays at their school compound or that there were too few schools located in the area of survey. From the results obtained, we can conclude that the survey was carried out in commercial and office areas.

There are some stations in the survey area where the purpose of parking is common. As we can see, most of the drivers who parked their vehicles along station I (Beach Street) and Station (Light Street) did so with the purpose of going to work. At station No. 8, the drivers who used the parking lots there were the staff of several government officers which were located in this area. For station no. 2, 6, 5 (Campbell Street, Kimberley Street and Carnavon Street) the majority of drivers who parked their vehicles here were engaged in business. The area

linked by these roads can be classified as a commercial area.

(ii) The Distance to Destination.

In order to obtain this distance, the distance given by the driver was converted to minutes by usage of natural walking speed at 200m/3 min.

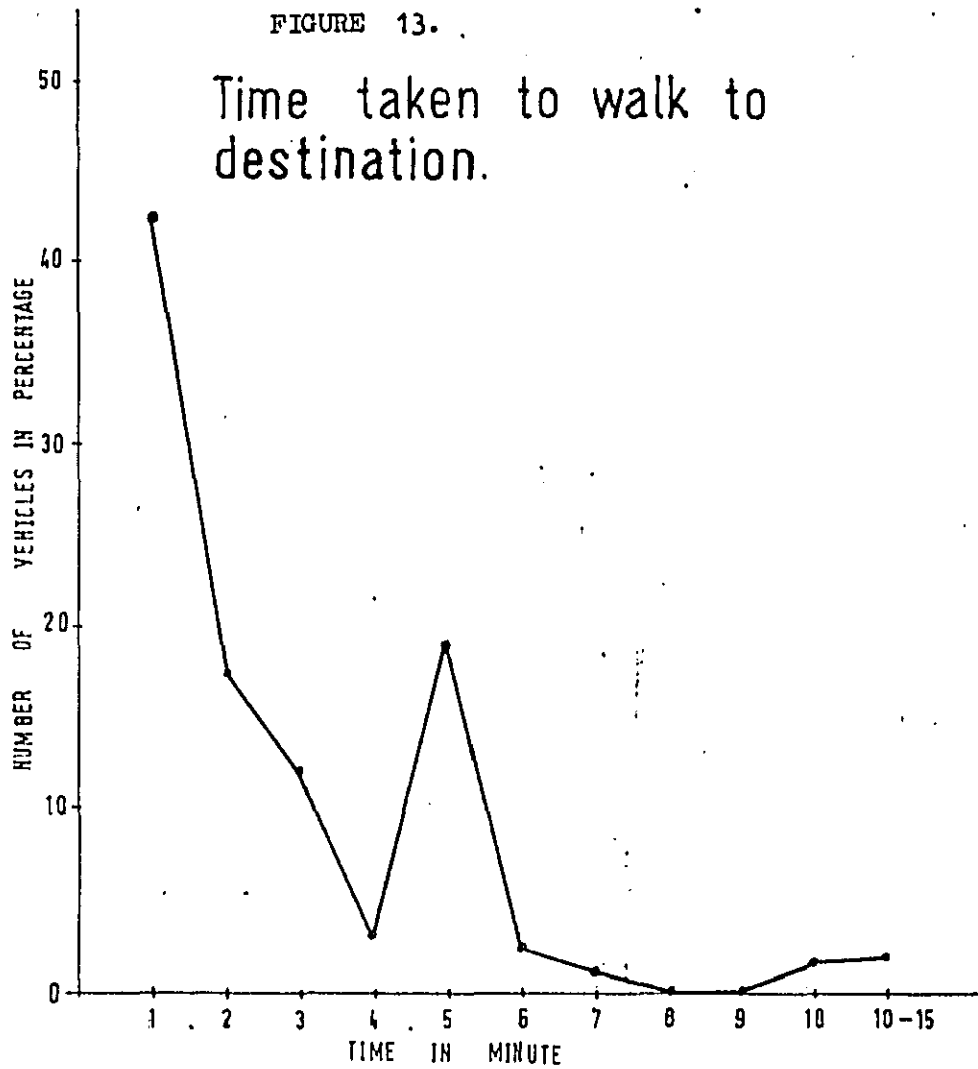
TABLE 17 AND FIGURE 13 SHOWS THE RESULTS OBTAINED.

TABLE 17 TIME TAKEN TO WALK TO DESTINATION.

MINUTES	NO. OF VEHICLES	PERCENTAGE
0	0	0.0
1	162	42.2
2	66	17.2
3	46	12.0
4	11	2.9
5	72	18.8
6	9	2.3
7	4	1.0
8	0	0.0
9	0	0.0
10	6	1.6
11-15	7	1.8
15	1	0.3
TOTAL	384	100.00

FIGURE 13.

Time taken to walk to destination.



From the results we can observe that about 70% of the drivers interviewed take 3 minutes to walk to their destination. It can be concluded that these drivers are willing to walk the distance 200m. radius from the parking areas. It shows, therefore that 200 m of coverage for parking areas can be expected. Most of these places of work on shopping areas are located within this 200m. radius from where the drivers parked their vehicles.

iii) Duration of Parking.

Drivers of cars and vans park their vehicles for an average of 2 hours and on the other hand, drivers of lorries and motorcycles park only for about 1 hour. Comparing the duration of parking at free-parking areas and at charged ones, drivers who parked their vehicles at

charged parking areas tend to park rather longer. The fact that 28 car-drivers parked their cars for more than 8 hours at charged parking areas suggests that the present cost of parking fees does not work as a strong impediment to parking for long periods of time.

The duration of parking also differs by the purposes of parking. If the purposes are related to business matters, the duration of parking tends to be longer than in the case of shopping and delivering of goods. Especially in the case when the car is used for commuting purposes, it is parked for more than 8 hours. Sometimes, on the other hand, 90% of the vehicles that had the purpose of delivering goods did not park for more than 1 hour.

TABLE 18 DURATION OF PARKING

TIME	NO. OF VEHICLES	CARS		VAN		LORRIES		M/C	
		Free	Charge	Free	Charge	Free	Charge	Free	Charge
Less than 30 min.	196	58	34	19	8	14	2	51	10
31 min. to 1 hr.	87	21	39	2	4	2	4	11	4
1 hr. to 3 hr.	36	11	12	2	5	1	0	2	3
3 hr. to 5 hr.	11	4	4	0	0	1	0	2	0
5 hr. to 8 hr.	11	3	4	2	0	0	0	2	0
8 hr. onward	43	7	28	4	2	1	0	1	0
SUB TOTAL		104	121	29	19	19	6	69	17
TOTAL	384	225		48		25		86	
MEAN TIMES		2.1		1.8		0.9		0.8	

TABLE 19 DURATION OF PARKING BY PURPOSE OF PARKING.

PURPOSE OF DURATION OF PARKING	GOING TO WORK	BUSINESS ENGAGEMENT	SHOPPING MARKETING	GOODS FREIGHT DELIVERY
Less than 30 min.	21 (34.4)	47 (46.1)	38 (60.3)	33 (68.8)
31 min. to 1 hour	5 (8.2)	22 (21.6)	20 (31.7)	9 (18.8)
1 hour to 3 hours	1 (1.6)	12 (11.8)	5 (8.0)	5 (10.4)
3 hours to 5 hours	4 (6.6)	4 (3.9)	-	-
5 hours to 8 hours	5 (8.2)	6 (5.9)	-	-
8 hours and above	25 (41.0)	11 (11.0)	-	1 (2.0)
TOTAL	61 (100.0)	102 (100.0)	63 (100.0)	48 (100.0)

(iv) Distribution of drivers residence.

The analysis for the drivers residence was only made for those who used parking lots in C.B.D. of George Town (i.e. Station No. 1, 2, 3, 4, 5, 6, 7 and 8).

The Majority of those who park their cars are from George Town and only a few are from the peninsular.

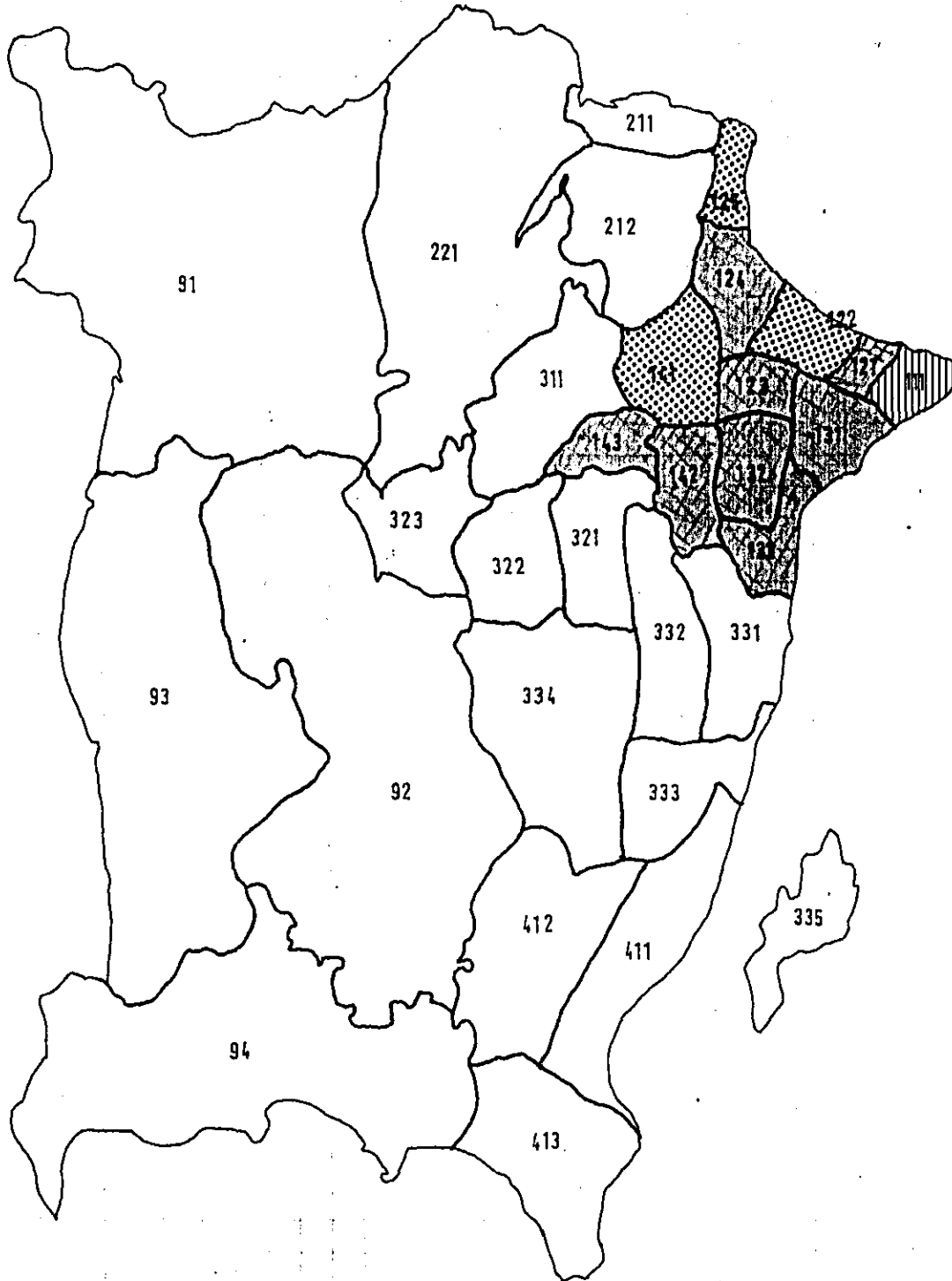
(Table 20 and Figure 14).

TABLE 20 DISTRIBUTION OF DRIVER'S RESIDENCE

Place of residence / Parking stations	Zone Code															
	111	121	122	123	124	125	131	132	133	141	142	143	2	3	4	5
1, 2, 3, 4, 5, 6, 7, 8.	30	12	7	12	13	8	10	11	13	3	10	19	12	23	0	7
Percentage	15.8	6.3	3.7	6.3	6.8	4.2	5.3	5.8	6.8	1.6	5.3	10	6.3	12.1	0	3.7

FIGURE 14

Distribution of Driver's Residence.



1-9 DRIVERS

10-19 DRIVERS

21-30 DRIVERS

TABLE 21 PLACE OF PARKING AT NIGHT.

PLACE	NO. OF VEHICLES	PERCENTAGE
1. GARAGE OF RESIDENCE	266	69.6
2. VACANT LAND	31	8.1
3. STREET PARKING	85	22.3
4. CHARGED CAR PARKS	0	0
TOTAL	382	100

TABLE 22 PLACE OF PARKING BY RESIDENCE

RESIDENCE PLACE OF PARKING	C.B.D. ZONE (111, 121, 131)	RESIDENTIAL ZONE (124, 141, 125)
GARAGE	28 (48.3)	19 (82.6)
VACANT LAND	7 (12.0)	1 (4.3)
STREET	23 (39.7)	3 (13.1)
CHARGED CAR PARK	0 (0)	0 (0)
TOTAL	58 (100.0)	23 (100.0)

In the zones of George Town, the majority of the owners of parked vehicles were residents of C.B.D. itself. So most of the drivers who use the parking lot of C.B.D. live nearby.

(v) Parking Place at Night.

About 70% of drivers use their own garage to park at night. However, about 40% of the residents of C.B.D. (Zone 111, 121 and 131) park their vehicles on the street and only about 48% of them has a garage. In the case of inhabitants of residential areas, (Zone 124, 141, 125), more than 80% of them possess a garage.

The total number of motorcars owned by the residents of C.B.D. is about 20,000. Therefore, about 8,000 of motorcars are possibly parked on the street at night in C.B.D. though this estimation is only a rough one and not so reliable.

Questionnaires to Wholesalers.

a) Purpose of the Study.

Delivery of goods, freight and commodities is one of the activities that is important in a city. It is necessary to provide adequate space such as loading and unloading space and parking space for these activities. Besides, these activities should properly harmonized with other traffic activities of the city.

Therefore, this survey will provide some essential information regarding the proper management of parking in the street.

b) Survey Procedure

Wholesalers of Pantai Street were interviewed according to the questionnaire attached in Table 23 on July 13 and 39 samples were collected.

Fig. 15 : THE LOCATION OF PANTAI STREET

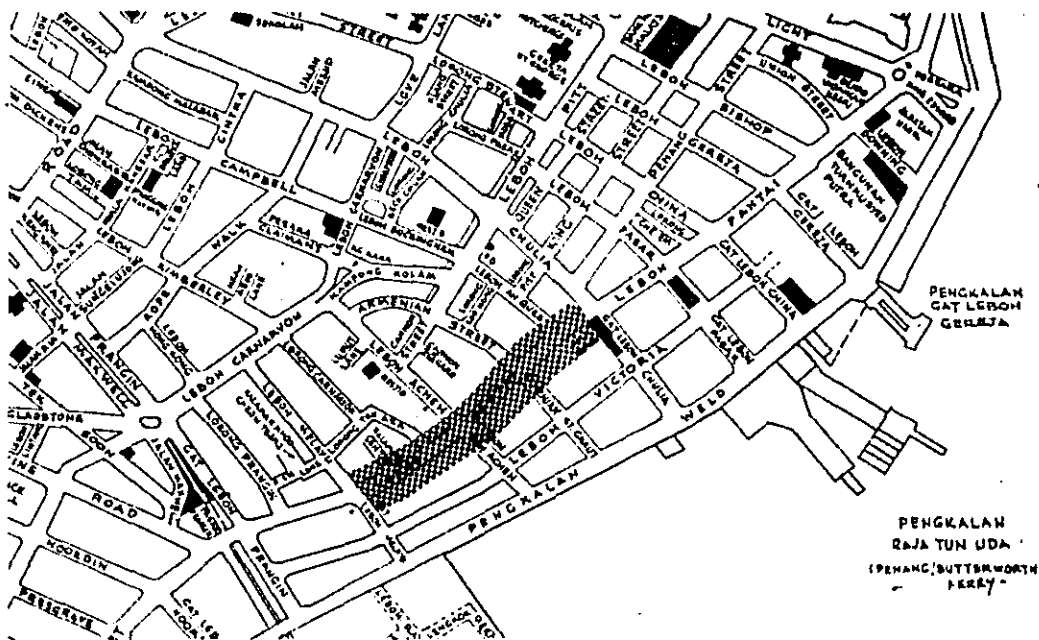


Table 23: QUESTIONNAIRE TO WHOLESALERS

Date:

Name of Street:

1. How many employees are you employed? persons.
2. Business hours is from to and closed on day.
3. What kind of goods do you usually deal in mainly?
4. Where do you transport your goods from usually?

1. Factory	2. Port
3. Wholesaler or traders.	4. Others.
5. Which area do you deliver to?

1. C.B.D. of Georgetown
2. Airport
3. Free Trade Zone in Bayan Lepas
4. Mainland
5. Others.
- If the answer for question no. 5 is 1. ; which road do you always deliver to?
-
6. Where are the goods delivered to?

1. Retailers	2. Wholesalers
3. Offices	4. Factories
5. Others.	
7. In the case of deliveries to retailers:-
 What time do you deliver usually?
 Means of transport used:

1. Lorry	2. pick-up
3. Van	4. Others
8. Do you have any problems of the present traffic condition?
 Yes / No If Yes , what sort of problems:

1. Parking	2. Jam
3. Accidents	4. Narrow Streets
5. Others.	

To be answered by the wholesaler who possesses transport.

9. Are you an owner of: Motor car
Lorry
Van, Pick-Up

10. Do you park your lorry and car at;

- I. own parking bay.
2. Street
3. Others

II. How do you stock your goods?

- I. warehouse (own)
2. warehouse (rental)
3. stockyard
4. Others.

12. Any suggestion how to improve the present traffic condition:-

c. Results of the Survey

i) Outline of Wholesalers

Most of them deal with daily commodities such as foodstuffs, canned goods, medicine, hardware, plastic etc. The size of these establishments is so small although they employ several people. Their business hours are mostly from 8.00 am to 5.00 pm.

Table 24 : TYPES OF GOODS

Types of goods	No. of samples
canned food	6
plastic	5
hardware	5
general goods	5

Table 25: NUMBER OF EMPLOYEES

No. of employees	No. of samples
I - 3	6 (17.2)
4 - 6	15 (42.8)
7 - 10	5 (14.3)
10 above	9 (25.7)
Total:	35 (100.0)

ii) Movement of Goods and Freights

Most of the goods were transported from the port and delivered to the mainland and the Central Business District of Georgetown. This business is heavily dependent on the port of Penang which is the dominant business centre in the northern part of Peninsular Malaysia. Since the major destination of delivery is the mainland, they enjoy the full merit of their location which is adjacent to the port and to the ferry terminal. So, it is very unlikely that the present location will be changed until the linkage of the new port is developed.

The major types of establishments to which the goods are delivered are retailers. In the case of Georgetown some of the destination of the delivery fall into the neighbour, but taking the delivery to the mainland into consideration, the wholesalers of this area seem to cover a rather wide region.

FIGURE 16. MOVEMENT OF GOODS.

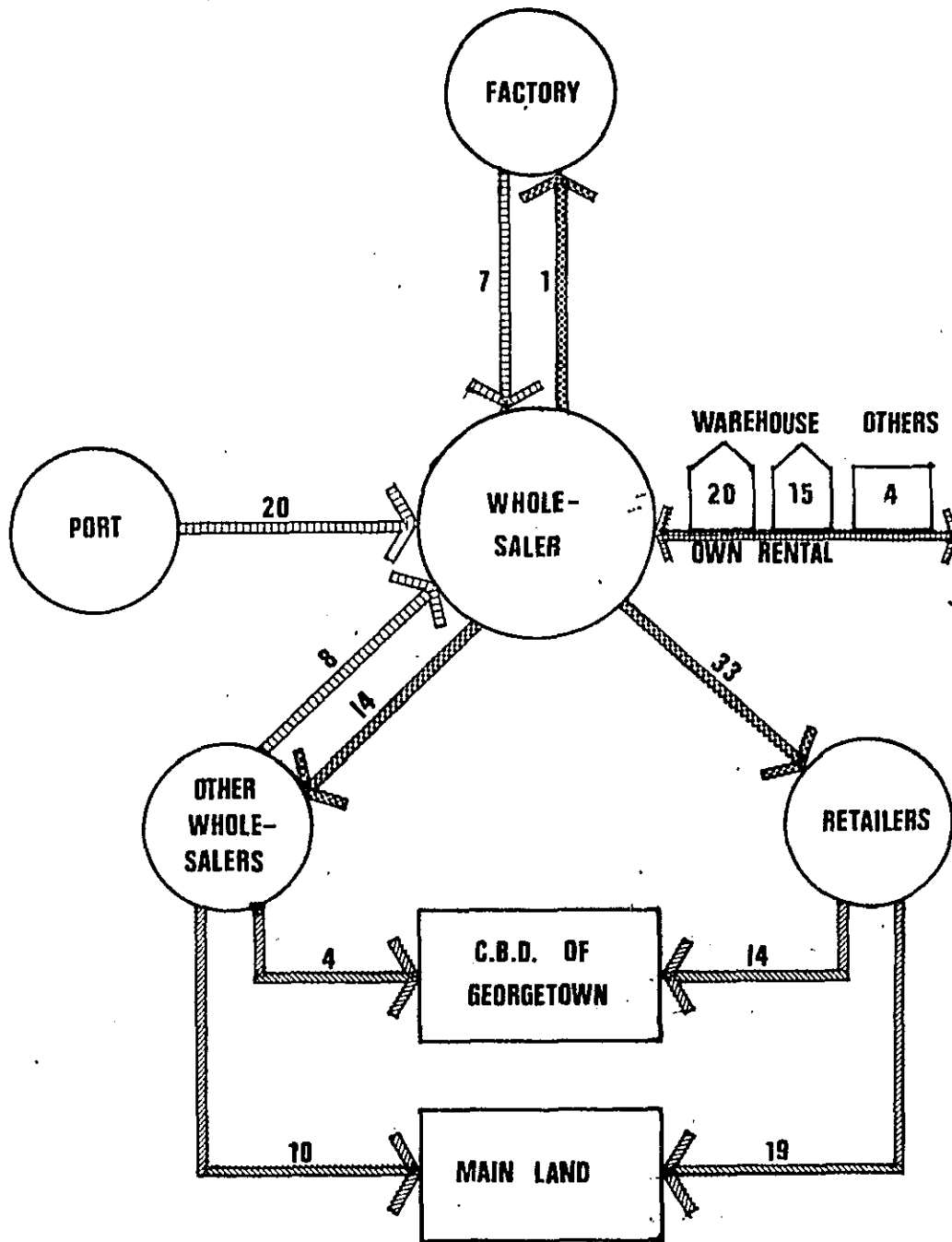


Table 26: ORIGIN OF GOODS

Factory	7
Port	20
Wholesalers	8
Others	4
Total:	39

Table 27: DESTINATION OF GOODS

Retailers	33
Wholesalers	14
Offices	2
Factories	1
Others	4
Total:	54

Table 28: AREA BEING DELIVERED TO

C.B.D. of Georgetown	15
Airport	1
Free Trade Zone	-
Mainland	22
Others	5
Total:	43

Table 29: PLACE OF GOODS STOCK.

Warehouse(own)	20
Warehouse(rental)	15
Stock Yard	0
Others	4

Name of street	No. of Sample
Jalan Pantai	3
Jelutong	3
Campbell	3
Bridge	3
Prangin	2
Macalister	2
Dato' Keramat	2
Ayer Itam	2
Weld Quay	2
Kimberly	2

iii) Vehicles

Most of them used lorries for the transport of goods goods, vans and other vehicles such as motorcars, carts and tricycle are also frequently used.

Table 30 : MEANS OF TRANSPORT BY DESTINATION.

	C.B.D. of Georgetown	Mainland
Lorry	8	10
Pick-up	2	-
Van	6	7
Others	7	8

note: sometimes two or three destination are delivered.

Although the ratio of the ownership of vehicles is high, most of the vehicles are parked on the street, even lorries.

Table 31 : OWNERSHIP OF VEHICLES

	No. of vehicles
motorcars	29
lorry	6
van, pick-up	9
Total:	44

note: some own two or three cars.

Table 32 : PLACE OF PARKING

	No. of samples
onw parking	6
street	31
others	3

iv) Time of Delivery and Traffic Problems

As business hours are usually in the daytime from 8.00 am to 5.00 pm, goods are delivered during this time. Most of the wholesalers deliver at anytime if there is demand, and only a few wholesalers have a specific time zone for delivery.

Table 33 : TIME OF DELIVERY

Time	No. of samples
anytime during office hours	19
morning	7
afternoon	6
specific time zones in the morning and afternoos afternoons	2

Lebuh Pantai (Beach Street) is congested with loading and unloading for almost the whole day, so the present problems which they faced badly are scarcity of parking spaces and of a smooth carriage-way for traffic. Some of them suggested that Pantai Street should be

converted to a one-way street and parking should be only on one side of the street.

Table 34 : THE PRESENT TRAFFIC PROBLEMS

Problems	No. of samples.
Parking	26
Traffic jam	7
Narrow streets	8
Accidents	-
Others	1

a). Major Findings of the Survey

- ii) The C.B.D. of Georgetown seems to have enough parking capacity on the whole but in areas such as Lebuh Pantai and other commercial areas where many wholesalers do their business, but the present capacity is not enough,
- ii) The location of wholesalers is closely related to the location of the port and the ferry. Therefore, it seems to be difficult to move the present location for wholesalers.
- iii) Zoning for a multi-storey carpark proposed at the vicinity of this area will be helpful in solving the present parking problems.

iv) If parking is not allowed on the streets of the Central Business District in future, it may be necessary to consider some form of exemption for loading and unloading activities. Wholesalers should change their delivery system by limiting the time period of delivery services.

