4.2 Feeder Bus Services in New Towns

Generally speaking, the feeder bus services in new towns are well-structures and extensively developed. The residents in most of the new towns are covered by feeder bus services within 250 to 300-meter radius. Table 4.6 presents the summary of feeder bus routes, while Figures 4.2 and 4.3 show the feeder bus routes and their coverage for individual new towns. Ang Mo Kio, Bedok, Bukit Batok, and Jurong East are the new towns best served by feeder buses. Bukit Merah, Clementi, and Queenstown new towns are not fully covered by feeder buses but are complemented by trunk services.

Table 4.6

Feeder Bus Services in HDB New Towns

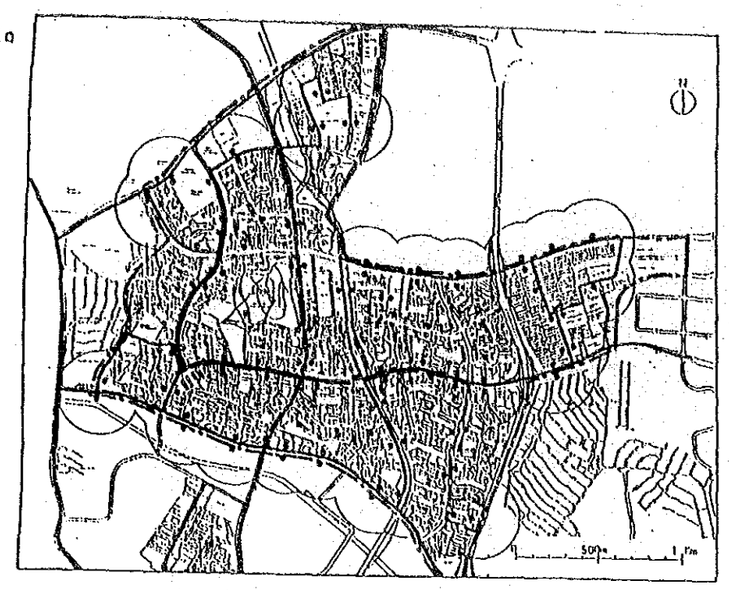
New Town	No. of Feeder Bus Routes	Total Round Trip Distance (Kms)	No. of Bus Stops	Area Covered by 250m (% to Total A.)	Average Bus Stop Spacing (m)
1. Ang Mo Kio	7	55.2	141	100	390
2. Bedok	10	78.5	172	100	460
3. Bukit Batok	4	20.4	56	95	370
(4. Bishan)	-	-	-	-	-
5. Buki Merah	5	20.1	56	100	360
(6. Choa Chu Kang)	-	-	-	-	-
7. Clementi	4	16.9	42	100	400
(8. Geylang)	-	-	-	-	-
9. Hougang	5	34.5	82	90	420
(10. Jalan Besar)	-	-	-	-	-
11. Jurong East	4	35.8	89	100	400
12. Jurong West	6	74.9	191	80	390
(13. Pasir Ris)	-	-	-	-	-
14. Queenstown	2	13.2	32	90	410
15. Serangoon	2	8.8	23	100	380
16. Tampines	4	18.0	48	70	380
17. Toa Payoh	5	25.4	60	100	420
18. Woodlands	2	9.2	n.k.	65	n.k.
19 Yishun	5	33.8	76	85	440
(20. Bukit Panjang)	-	-	-	-	-
TOTAL	65	444,7	1,068	-	410

Source: Worked out based on Figure 4.2 And and Appendix A.

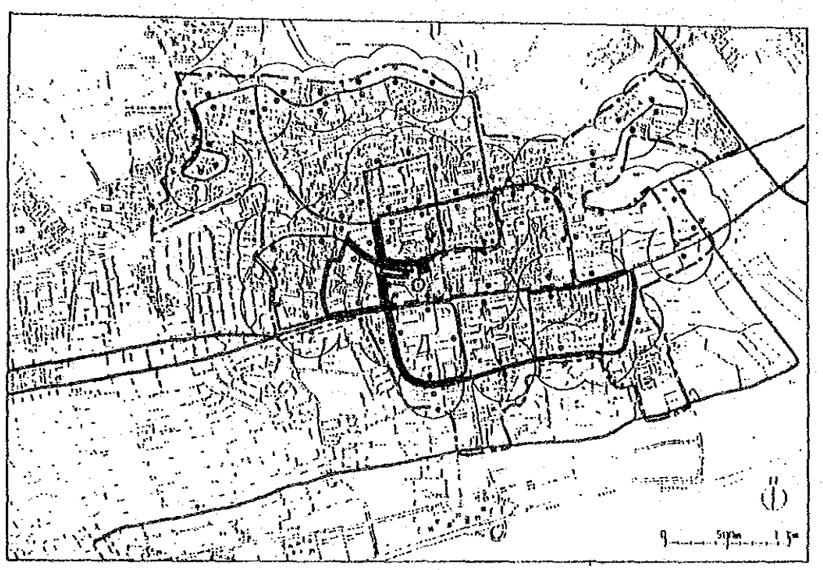
Figure 4.2

Feeder Bus Routes and Treir Coverage for Ang Mo Kio, Bedok, Bukit Batok, Bukit Merah, Clementi, Hougang, Jurong East

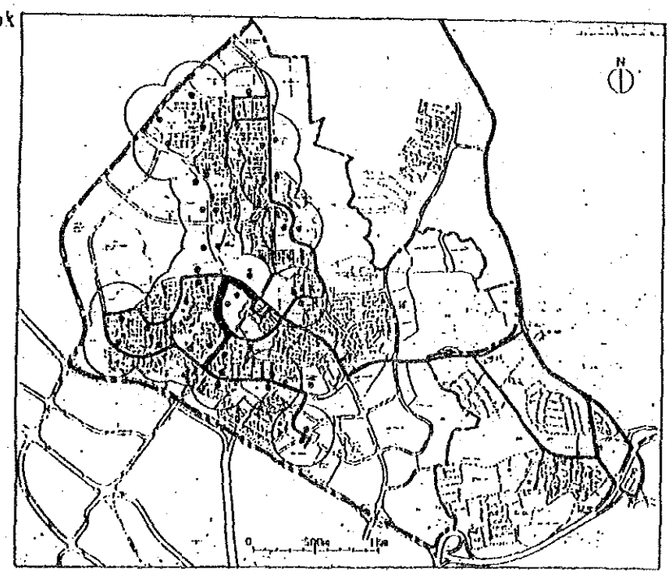
Ang Mo Kio



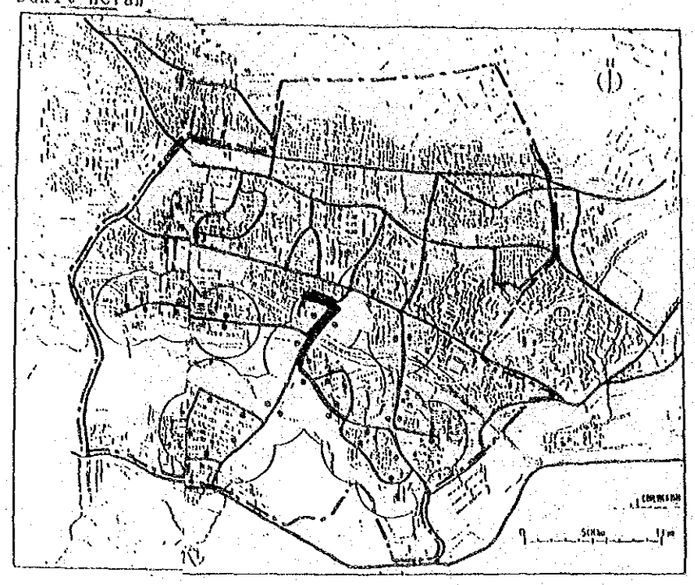
Bedok



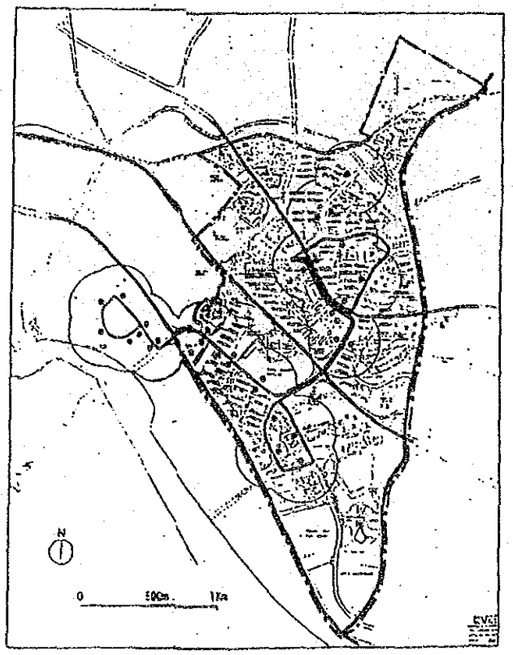
Bukit Batok



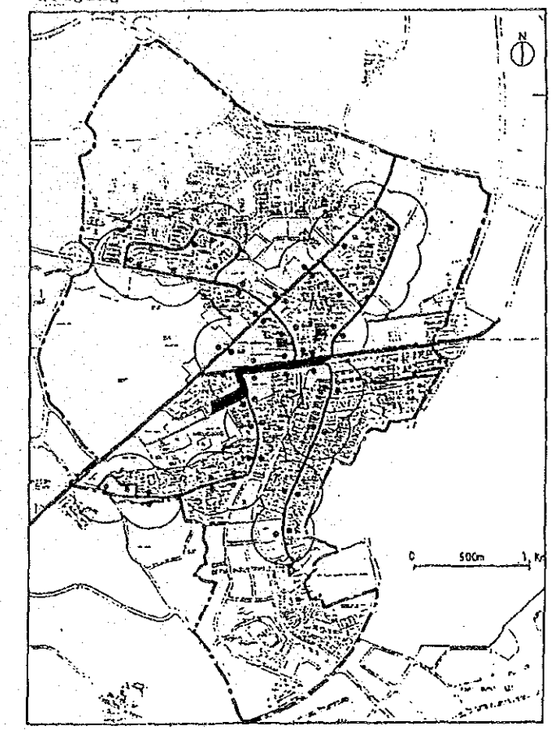
Bukit Merah



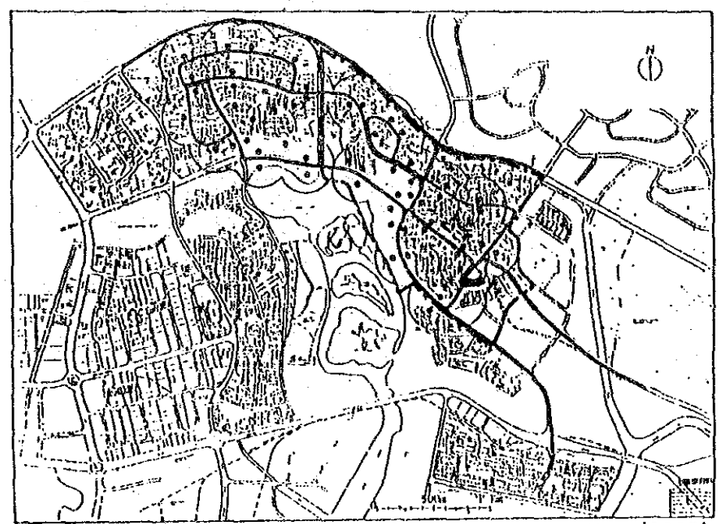
Clementi



Hougang



Jurong East



— Feeder Bus Route

300 m

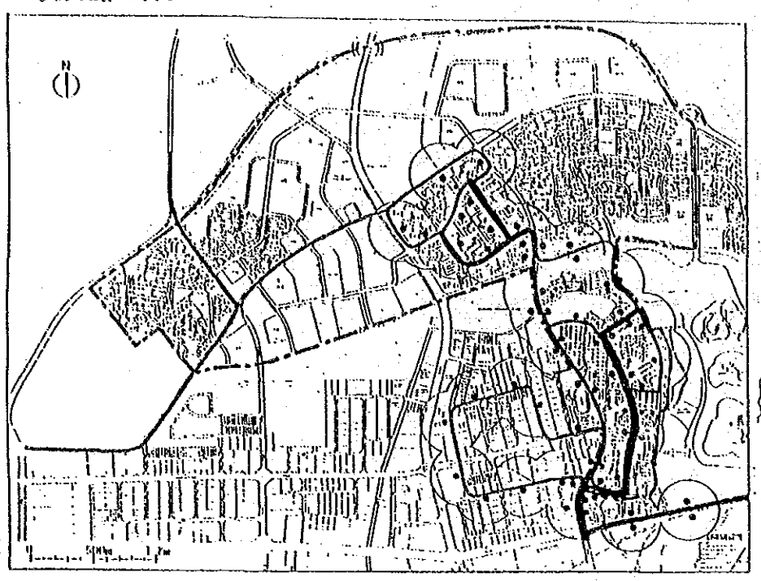
Bus stop

Source: SBS Bus Map (1985)

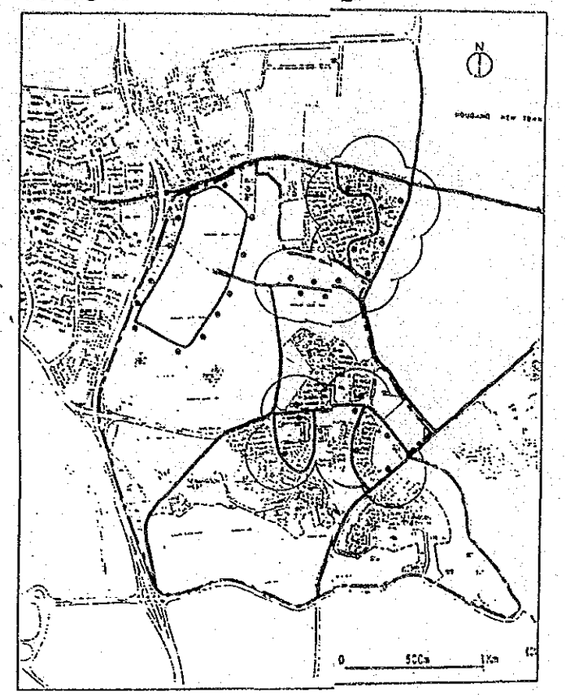
Figure 4.3

Feeder Bus Routes and their Coverage for Jurong West, Queenstown Serangoon, Tampines, Toa Payoh, Woodlands, Yishun

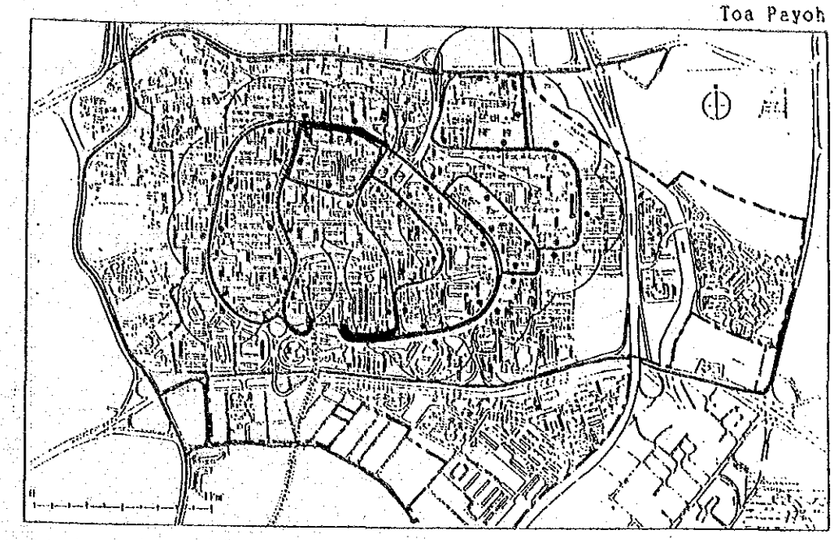
Jurong West



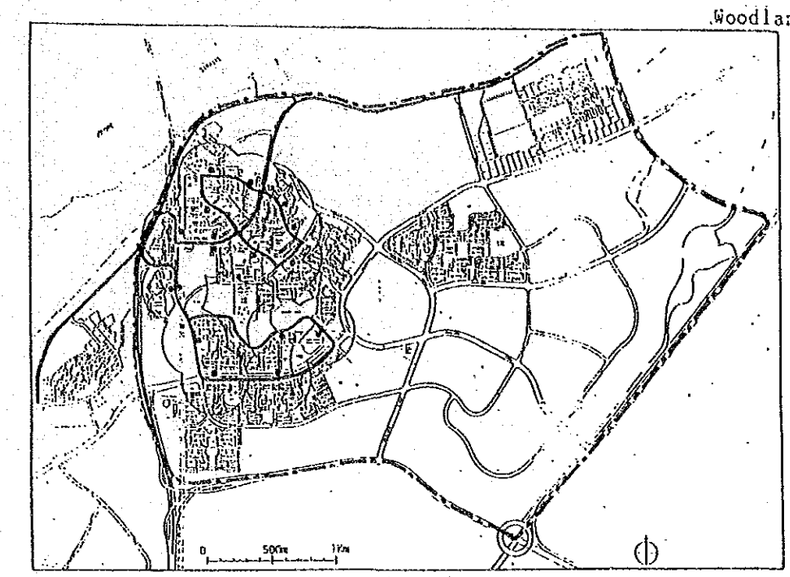
Serangoon



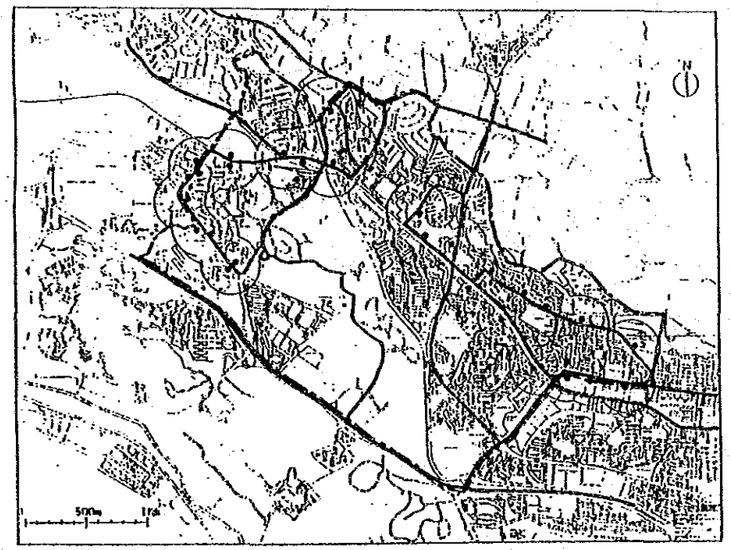
Toa Payoh



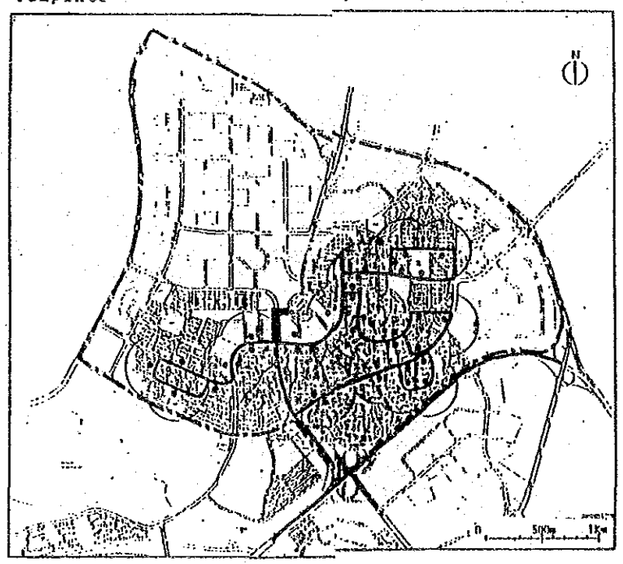
Woodlands



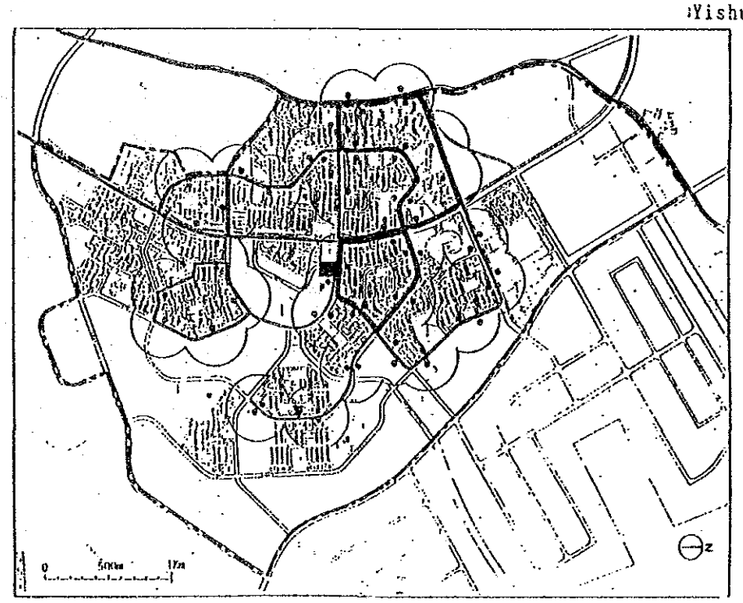
Queenstown



Tampines



Yishun



Feeder Bus Route

300 m

Bus stop

Source: SBS Bus Map (1985)

4.3 Feeder Bus Operation in New Towns

4.3.1 Operational Characteristics

In 1987, SBS operated 318 buses or 14% of the total SBS bus fleet for 58 feeder routes in 12 HDB new towns. The buses are mostly single deckers; there were, however, 19 double deckers allocated for Jurong East and West new towns. SBS feeder buses operated a total of 63,000 bus-kms per day with a total of 9,270 scheduled trips.

An average feeder bus service operates 6.8 kms long route (round trip) with 5 buses, while an average bus travels 199 kms per day with an average round trip time and speed of 29 minutes and 14 kms per hour, respectively. Feeder bus service operates usually from 1730 through 2400 hours (departure time at interchange/terminal), approximately thirty minutes earlier or later than trunk bus operation. Some services operate until 0100 of the following day.

A rundown of the operational characteristics of feeder bus services is shown in Table 4.7.

Table 4.7

Operational Characteristics of Feeder Bus Services

New Town	No. of Buses Allocated	No. of Scheduled Trips/day	Total Kms Run/ Bus/ Day	No. of Trips/ Bus/day	Average Speed (kph)	Frequency	
						Peak	Off-Peak
1. Ang Mo Kio	55	1,417	223	26	14.0		
2. Bedok	64	1,487	182	23	14.3		
3. Bukit Batok	4	661	56	95	370		
(4. Bishan)	15	-	-	-	-		
5. Buki Merah	-	170	56	100	360		
(6. Choa Chu Kang)	22	-	-	-	-		
7. Clementi	9	191	42	100	400		
(8. Geylang)	-	-	-	-	-		
9. Hougang	24	191	82	90	420		
(10. Jalan Besar)	-	-	-	-	-		
11. Jurong East	27	239	89	100	400		
12. Jurong West	42	239	191	80	390		
(13. Pasir Ris)	-	-	-	-	-		
14. Queenstown	6	173	32	90	410		
15. Serangoon	4	206	23	100	380		
16. Tampines	20	214	48	70	380		
17. Toa Payoh	30	150	60	100	420		
18. Woodlands	n.k.	n.k.	n.k.	65	n.k.		
19 Yishun	n.k.	n.k.	76	85	440		
(20. Bukit Panjang)	-	-	-	-	-		
TOTAL	318	9,270	1,068	-	410		

Source: Worked out based on Figure 4.2 And and Appendix A.

As shown in Table 4.8 the average route length (round trip distance) of 65 feeder services is6.8 kms, although it ranges between the one shorter than 3 kms and the one longer than 10 ksm.

Table 4.8

Distribution of Route Length of Feeder Bus Services

Route Length (Round Trip Distance): Kms	No. of Routes	% to Total
0 - 2.99	3	4.6
3.0 - 4.99	19	29.2
5.0 - 6.99	18	27.7
7.0 - 9.99	16	24.6
10.0 - above	9	13.9
Total	65	100.0

Source: Worked out based on Appendix A

The average number of bus stops per route is 17, with average spacing of 410 meters.

Details of the operational characteristics are as follows:

1) Frequency of Services

Feeder buses have relatively frequent services as shown in Table 4.9. Particularly during the peak hours, 55% of the services are operated with 3 to 5 minutes headway.

Table 4.9

Frequency of Feeder Bus Service

Headway (min)	Peak Hours		Off-peak Hours	
	No. of Routes	(%)	No. of Routes	(%)
3 - 4.9	32	(55.2)	2	(3.4)
5 - 6.9	6	(10.3)	22	(37.9)
7 - 9.9	11	(19.0)	20	(34.5)
Over 10	9	(15.5)	14	(24.1)
Total	58	(100.0)	58	(100.0)
Average (min)	4.9		7.4	

Source: Worked out based on Appendix A

2) Travel Time

Travel time comprises waiting time, walking time, access/egress time between bus stop and residence, waiting time at bus stop and/or bus interchange and riding time on feeder bus. Table 4.10 shows the average walk and wait time required within new towns. This indicates that a considerable amount of time needs to be spent only for walk and wait. Passengers who go out of new towns are required to spend 24.5 minutes and 33.4 minutes during peak and off-peak hours, respectively, for walk and wait purposes. The figures do not vary much by new town and it is commonly observed that the wait and walk time of off-peak hours is approximately 10 minutes longer than that of during peak hours.

Travel time between new towns and the CBD is shown in Table 4.11. Although the estimated figures at this stage are not considered fully accurate, it indicates travel time within new towns alone reaches at least 30 to 40 minutes and seems to share a considerable portion of the total travel time between new town and the CBD.

It is estimated that SBS feeder bus services carry a total of about 695,000 passenger trips/day, which account for 30% of the total daily passenger trips of SBS bus services (2.31 million

Table 4.10

Average Walk Time and Wait Time at Bus Stops/Interchanges of New Towns 1/

New Town	Access Time (walking to Bus Stop) : min	Waiting Time at Nearest Bus Stop		Waiting Time at Bus Interchange Min.				Total (Walk + Wait) Time: Min			
				Feeder		Trunk		From Residence To Trunk Bus		From Trunk Bus To Residence	
		Peak	Off-peak	Peak	Off-peak	Peak	Off-peak	Peak	Off-peak	Peak	Off-peak
1. Ang Mo Kio	8.2	7.8	10.3	7.8	9.5	9.3	12.8	25.3	28.0	16.0	17.7
2. Bedok	5.4	7.5	12.8	6.9	11.8	9.5	14.6	22.4	32.8	12.3	17.2
3. Bukit Batok	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.
5. Bukit Merah	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.
7. Clementi	7.0	7.0	12.4	13.0	16.4	11.8	15.0	25.8	34.4	20.0	23.4
9. Hougang	5.9	9.3	15.6	8.4	13.7	12.6	16.0	27.8	37.5	14.3	19.6
11. Jurong East	5.1	10.3	13.5	7.9	12.1	9.0	14.6	24.4	33.2	13.0	17.2
12. Jurong West	4.5	7.4	13.1	8.0	11.3	11.0	15.4	22.9	33.0	12.5	15.8
14. Queenstown	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.
15. Serangoon	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.	n.k.
16. Tampines	7.3	7.9	10.0	7.9	10.0	10.0	12.4	25.2	29.7	15.2	17.3
17. Toa Payoh	5.6	7.1	13.5	7.0	11.9	8.4	14.1	21.1	33.2	12.6	17.5
Average	6.2	8.2	12.7	8.2	12.2	10.1	14.5	24.5	33.4	14.4	18.4

Source: PWD Officials Survey.

1/ data with less than five samples are shown as n.k.

Table 4.11

Travel Time Composition Between New Town and CBD

New Town	Total Walk and Wait Time from Residence To Trunk Bus: Min 1/		Ave.1/ Riding Time of Feeder Bus : Min	Estimated Total Travel Time within New Town		Riding3/ Time of Trunk Bus to CBD: Min
	Peak	Off-peak		Peak	Off-peak	
1. Ang Mo Kio	25.3	28.0	12.0	37.3	40.0	43.0
2. Bedok	22.4	32.8	12.0	34.4	44.8	40.7
3. Bukit Batok	n.k.	n.k.	8.0	32.5	41.4	67.0
5. Bukit Merah	n.k.	n.k.	8.0	32.5	41.4	25.7
7. Clementi	25.8	34.4	10.0	35.8	44.4	50.0
9. Hougang	27.8	37.5	12.0	39.8	49.5	39.6
11. Jurong East	24.4	33.2	12.0	36.4	45.2	57.0
12. Jurong West	22.9	33.0	12.0	34.9	45.0	54.0
14. Queenstown	n.k.	n.k.	10.0	34.5	44.4	39.3
15. Serangoon	n.k.	n.k.	10.0	34.5	44.4	50.1
16. Tampines	25.2	29.7	8.0	33.2	37.7	70.5
17. Toa Payoh	21.1	33.2	8.0	29.1	41.2	31.5
Average	24.5	33.4	-	-	-	47.4

Source: 1/ PWD officers survey

2/ assumed

3/ estimated based on scheduled turn around time of SBS buses

passenger trips in 1986). The number of passengers, passenger per bus-km and per trip by new town are shown in Table 4.12. It shows that feeder bus services in Ang Mo Kio, Bedok, Bukit Merah, Clementi, and Toa Payoh new towns have a large number of passengers per bus-km, because these new towns are already developed and demand of feeder buses is large compared with their route distance.

Table 4.12

Feeder Bus Passengers (SBS)

	No. of Cash Rides	No. of[1/] Pass. Per Day	No. of Pass. Per Bus Km	No. of Pass. Per Trip	No. of Scheduled Trips/day
1. Ang Mo Kio	89,837	128,339	12.43	90.5	1,417
2. Bedok	102,823	146,890	14.19	98.7	1,487
3. Bukit Batok	20,101	28,716	8.47	43.4	661
4. Bukit Merah	34,044	48,634	12.85	52.4	929
5. Clementi	14,783	21,119	13.13	52.0	406
6. Hougang	37,080	52,971	11.47	79.9	663
7. Jurong East	39,131	55,901	8.69	77.5	721
8. Jurong West	61,954	88,506	10.10	110.1	804
9. Queenstown	2,297	3,281	3.18	20.9	157
10. Serangoon	3,516	5,023	5.83	26.9	187
11. Tampines	33,678	48,111	11.06	50.5	953
12. Toa Payoh	47,521	67,887	15.04	76.7	885
Total	486,765	695,378	-	-	9,270
Average			11.58	75.0	

Source: SBS, 1987

1/ No. of Passengers/day has been estimated as follows:
No. of Cash Rides/0.7.

According to the survey from SBS, a total of 255 arriving feeder buses at Ang Mo Kio bus interchange carried 12,188 passengers for an average 62% of their load capacity, while 269 departing buses carried 7,538 passengers for a low average of 40.7% of their loading capacity as shown in Table 4.13.

Table 4.13

Capacity Utilization of Feeder Bus Service
at Ang Mo Kio Bus Interchange
(AM Peak: 0600-0900)

Service No.	Arriving			Departing		
	No. of	Average Capacity	Buses	No. of	Average Capacity	Buses Over 100%
261	56	75.3	10	59	40.8	4
262	23	44.9	1	25	9.2	0
265	45	82.9	16	47	15.6	0
266	50	61.8	5	48	28.1	2
267	42	33.3	0	45	75.5	18
269	39	61.7	0	45	42.3	4
Total	255	62.2%	32	269	40.7%	28

Source: SBS
1/ Average capacity is assumed 77 for single decker

4.3.2 Bus Interchange

Bus interchanges constructed in some major new towns play an important role for bus passengers. Feeder service and trunk service are distinguished from each other and integrated at the bus interchanges. At present, eight new towns are provided with bus interchanges. An example of a bus interchange is shown in Figure 4.4, while the layouts of the others are shown in Appendix 4.B.

Table 4.14 gives an indicative level of bus passenger traffic at bus interchanges in selected new towns. A total number of boarding/alighting passengers at bus interchanges reach approximately 20,000 to 30,000 for three hours of morning peak period. A bus survey conducted at Ang Mo Kio shows that about 3,000 passengers concentrate in just 15 minutes during peak hours, which results in congestions at the interchange.

Table 4.14

Boarding and Alighting Activities in New Town Interchanges/Terminals
(AM Peak: 0600 to 0900 hours)

New Towns	Month of Survey	Total Alighting From Feeder Services	Total Boarding On Trunk Services	Total
Ang Mo Kio[1/]	Jul 87	12,604	17,438	30,042
Bedok[1/]	May 87	13,422	16,448	29,870
Bishan	Jul 87	-	492	492
Bukit Batok	Sep 87	3,258	2,569	5,827
Bukit Panjang	Jul 87	-	977	977
Clementi[1/]	May 87	1,493	2,505	3,998
Hougang[1/]	Sep 87	4,580	3,646	8,226
Jurong East[1/]	Jul 87	4,500	5,638	10,138
Tampines	Jul 87	8,533	16,794	25,327
Toa Payoh[1/]	Apr 87	6,768	12,059	18,827

Source: SBS

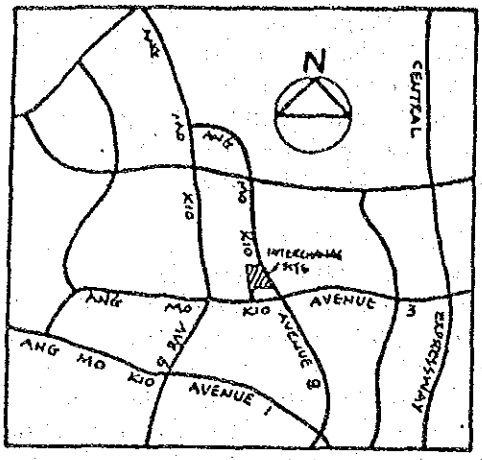
1/ These new towns are provided with bus terminals.
2/ The traffic counts are all bus services (i.e., SBS, TIBS, CSS, and Scheme B) terminatign/originating from the town interchange/terminal. Traffic counts on trunk services running through the town are not included.

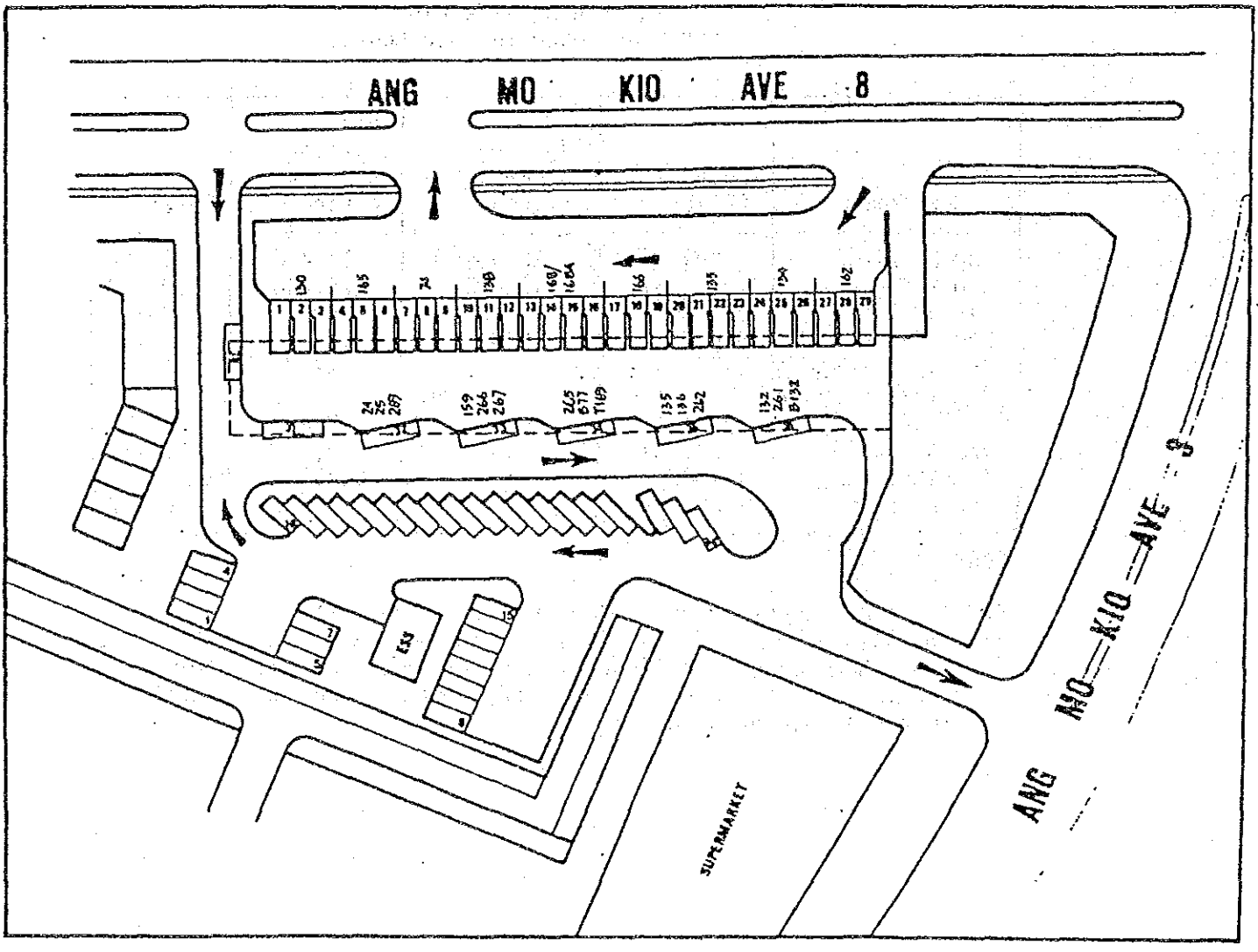
Figure 4.4

Layout of Ang Mo Kio
Bus Interchange

No. of Bays Available	:	63
End-on Berths	:	29
Sawtooth Berths	:	7
Layover Bays	:	34
No. of Services	:	25
Trunk Services	:	18
Feeder Services	:	6

Source: SBS





4.3.3 Financial Aspect of Bus Operation

Feeder bus service introduces a flat fare system. The are level is set such that it is cheaper that that of trunk bus service. As shown in Table 4.15, nearly 90% of the feeder bus services charge only 15 cents, while the rest, mostly 30 cents, and one route charges 40 cents. On the other hand, trunk bus service applies a distance fare, with a minimum fare of 40 cents up to 3.2 kms. Concession stamp/price is shown in Table 4.16.

Table 4.15

Feeder Bus Service

	No. of Services	%
15 cents flat fare	52	89.7
30 cents flat fare	5	8.6
40 cents flat fare	1	1.7
	58	100.0

Source: SBS Mini Bus Guide 1986

Table 4.16

Concession Passenger Price

Type of Passenger	Price of Monthly Concession Stamp
Primary Student	$12.00
Secondary Student	15,00
Provisional Pre-V1	15.00
Student 'A'	27.00
Full-time National Servicemen	33.00
Shareholder	40.00

Source: SBS Mini Bus Guide 1986

The financial status of feeder bus operation is shown in Table 4.17, with simple comparison of the estimated operating cost and the income from cash rides. It shows feeder bus services in all new towns are financially deficient.

Table 4.17

Income and Cost of Feeder Bus Service

New Town	Daily Income[1/] from Cash Rides (S$)	Estimated[2/] Operating Cost (S$)	Income Cost
1. Ang Mo Kio	15,053	19,250	78.2
2. Bedok	16,064	22,400	71.7
3. Bukit Batok	3,015	5,250	57.4
4. Bukit Merah	5,107	7,700	66.3
5. Clementi	2,217	3,150	70.4
6. Hougang	5,562	8,400	66.2
7. Jurong East	5,870	10,010	58.6
8. Jurong West	10,193	15,470	65.9
9. Queenstown	499	2,100	23.8
10. Serangoon	527	1,400	37.6
11. Tampines	5,052	7,000	72.2
12. Toa Payoh	7,128	10,500	67.9

Source: Worked out based on SBS Data

1/ Income = Daily Cash Rides x Fare

2/ Cost:
Number of Buses Operated x $350/day for single deck
$420/day for double deck

4.4 Assessment of Feeder Bus Services

Existing feeder bus service were preliminarily assessed based on the "Limited HIS Survey" and the "Feeder Transport Survey for PWD Officials" conducted by the Study Team. It is to be noted that the analysis made here has not fully reflected the results of the above surveys because the data processing has not been completed yet.

1) Use of Feeder Bus Service

As shown in Table 4.18, those residing in new towns use more frequently the feeder bus services. Thirty-eight pe@rcent of the new town residents use feeder buse services, while only 17% of the residents in other areas do.

Table 4.19 shows those who belong to non-car-owning households rely more on feeder bus services (approximately 46% of them can be compared with 24% for those of car-owning households.

Dependency to feeder us services varies by new town. More than 50% of the people use feeder buses in Jurong East and West, Tampines and Toa Payoh new towns, while only about 20% do in Bukit Batok, Clementi, and Serangoon new towns, as shown in Table 4.2.

Table 4.21 shows the frequency of using feeder buses. An average feeder bus user uses the services for 5.5 times a week.

Table 4.18

Use of Feeder Bus Services

No. of Persons (%)

	Bus User	Non-User	Total
Residents in HDB new towns	117 (38.1)	190 (61.9)	307 (100.0)
Other than HDB new towns	52 (17.2)	250 (82.8)	302 (100.0)
Total	169 (27.8)	440 (72.2)	609 (100.0)

Source: PWD Officials Survey (1987)

Table 4.19

Use of Feeder Bus Service by Car Ownership

No. of persons

	Bus User	Non-user	Total
Non-Car-Owning Households	92 (45.5)	110 (54.5)	202 (100.0)
Car-Owning Households	25 (23.8)	80 (76.2)	105 (100.0)
Total	117 (38.1)	190 (61.9)	307 (100.0)

Source: PWD Officials Survey

Table 4.20

Use Feeder Bus Service by Zone

New Town	No of Feeder Bus Routes	Total Route Length (Km)	% of Feeder Bus User
1. Ang Mo Kio	7	55.20	40.0
2. Bedok	10	78.52	43.4
3. Bukit Batok	4	20.44	22.7
4. Bukit Merah	5	20.05	-
5. Clementi	4	16.93	27.8
6. Hougang	5	34.51	43.5
7. Jurong East	4	35.76	56.3
8. Jurong West	6	74.85	61.5
9. Queenstown	2	13.22	-
10. Serangoon	2	8.80	20.0
11. Tampines	4	18.02	52.4
12. Toa Payoh	5	25.42	52.0
13. Woodlands	2	9.20	-
14. Yishun	5	33.75	45.5
Total Average	65	444.67	38.1

Source: SBS

Table 4.21

Frequency of Feeder Bus Service Usage
by Trip Purpose (Multi-Answer)

	0	1-3	4-5	6-8	9-10	11-	Total	Average[1/]	Average[2/]
To/From Work	75	15	2	31	8	38	169	5.5	9.9
To/From School	164	1	1	3	0	0	169	0.1	5.0
Part of Work	162	5	0	1	1	0	169	0.1	3.6
Personal Business	148	12	5	3	1	0	169	0.4	3.6
Shopping	122	40	5	2	0	0	169	0.6	2.0
Recreaion	147	19	2	1	0	0	169	0.3	2.2
Social	127	30	8	4	0	0	169	0.7	2.7
Total	945	122	23	45	10	38	1183	1.1	5.5

Source: PWD Officials Interview Survey

1/ includes 0 time
2/ excludes 0 time

2) Access to and Condition of Bus Stop

The average walking time to the nearest bus stop was recorded at 6.6 minutes. The walking time to the nearest bus stop within 5 minutes was assessed to be acceptable by more than half of PWD officials. However, those who take more than 5 minutes assessed that present condition is not so good, as shown in Figure 4.5. A five-minute walk is equivalent to a walking distance of about 300 meters.

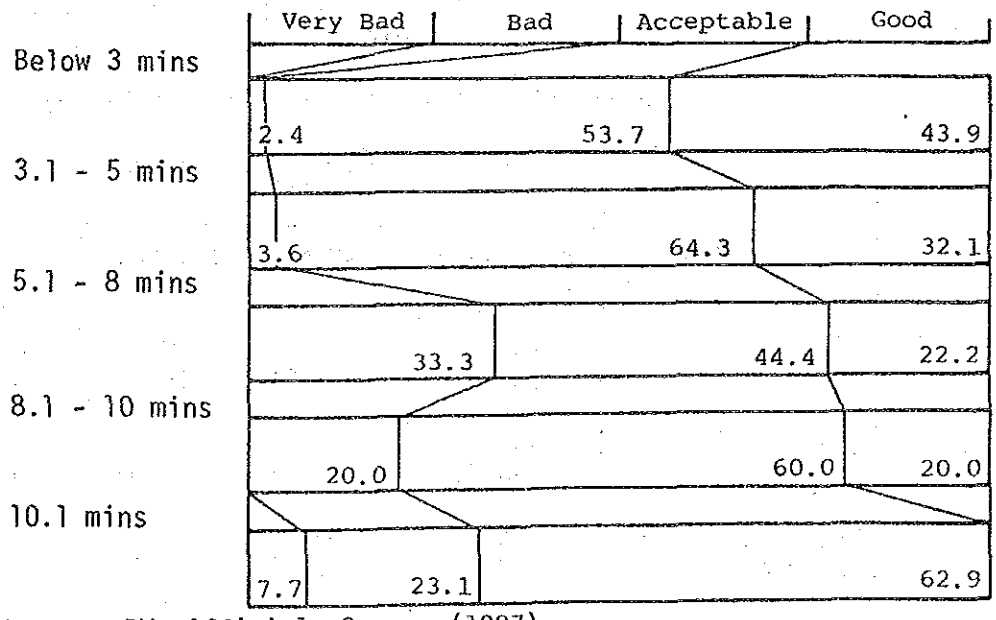
The walking condition to bus stops was considered mostly good or acceptable. Provision of paved path, street light, and shade is considered important but the same is not true for stairs, as shown in Figure 4.6.

As shown in Table 4.22, shelter and seat provided for more than 80% of feeder bus stops, while bus information service was available only for 38% of bus stops. The availability of shelter, seat, and bus information service is considered important, as shown in Figure 4.7.

The average waiting time at feeder bus stops was 7.9 minutes during peak hours, while it was 12.1 during off-peak hours. A tolerable waiting time was assessed roughly 10 minutes for peak hours as shown in Figure 4.8. The assessment of waiting time for off-peak is shown in Figure 4.9.

Figure 4.5

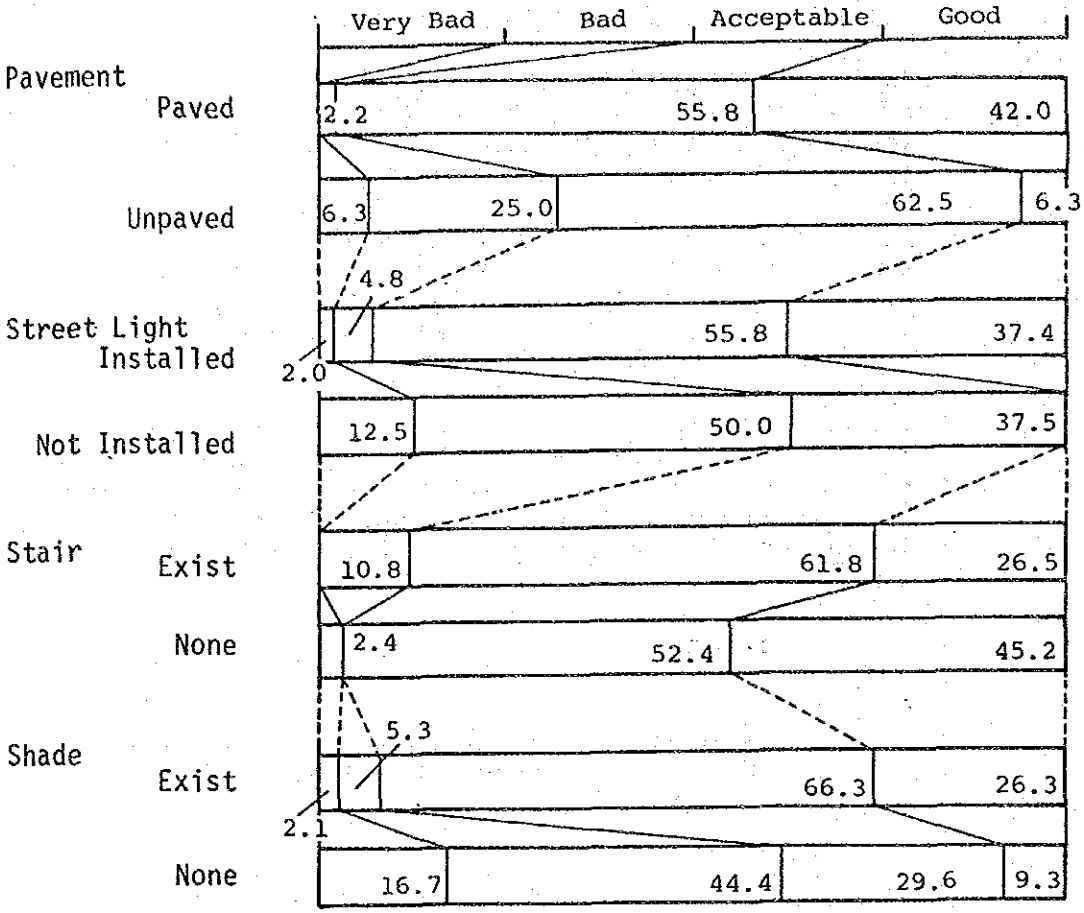
Assessment of Walking Time to the Nearest Feeder Bus Stop



Source: PWD Officials Survey (1987)

Figure 4.6

Assessment of Walking Condition of Path to Bus Stops



Source: PWD Officials Survey (1987)

Table 4.22

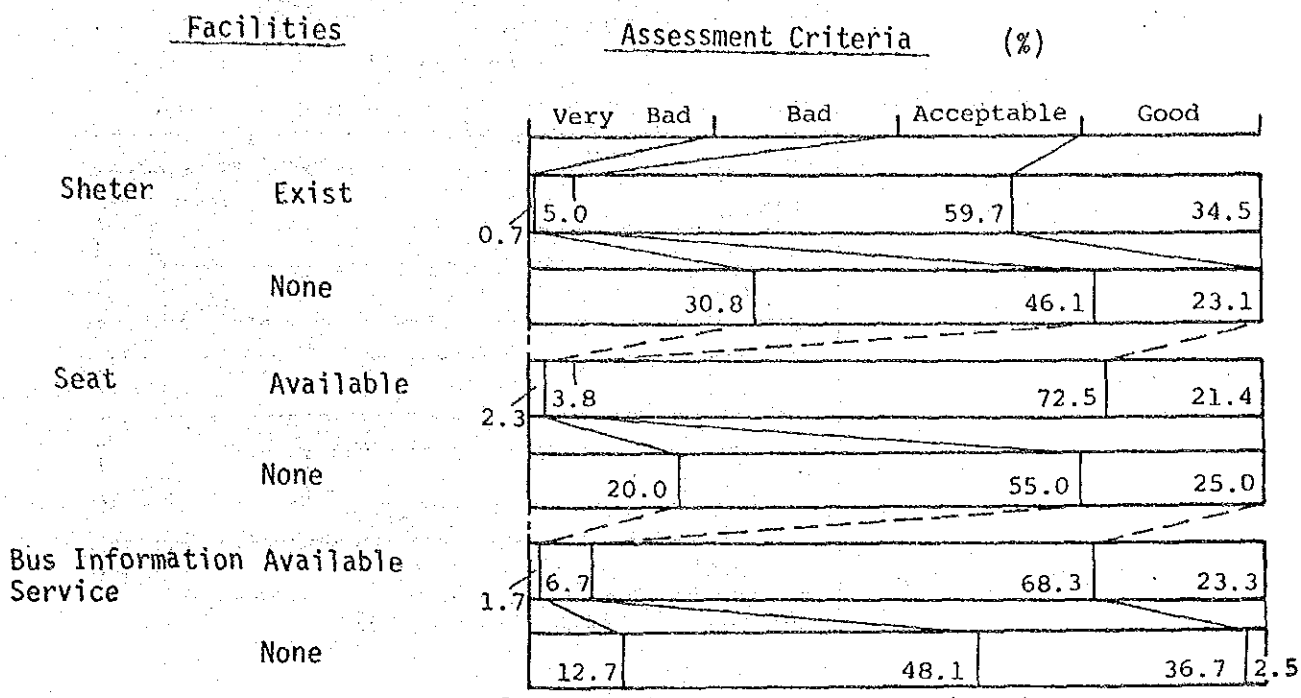
Availability of Facilities at Bus Stops

Facility	Availability			Total
	Available	None	No Known	
Shelter	145 (85.8)	14 (8.3)	10 (5.9)	169 (100.0)
Seat	136 (80.5)	22 (13.0)	11 (6.5)	169 (100.0)
Bus Information Service	64 (37.9)	94 (55.6)	11 (6.5)	169 (100.0)

Source: PWD Officials Survey (1987)

Figure 4.7

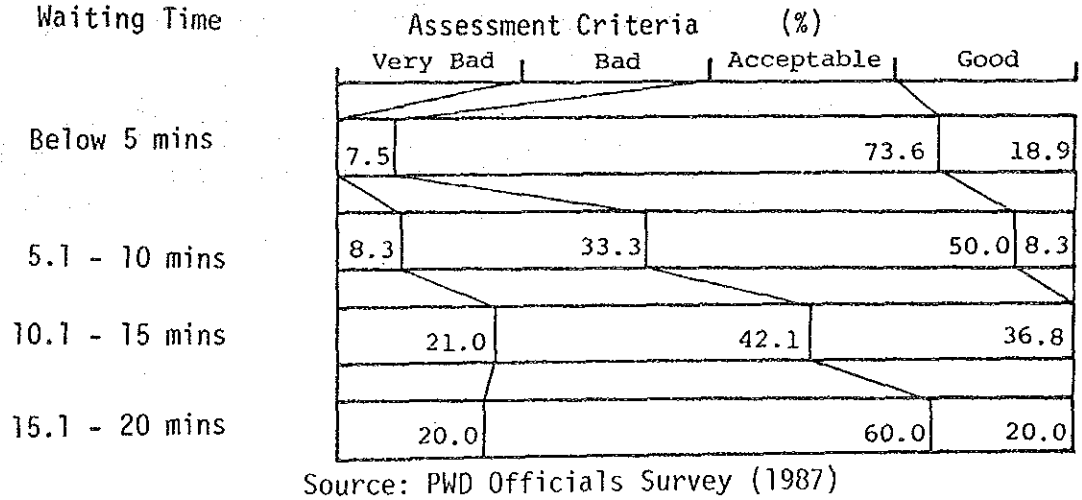
Assessment of Facilities at Bus Stops



Source: PWD Officials Survey (1987)

Figure 4.8

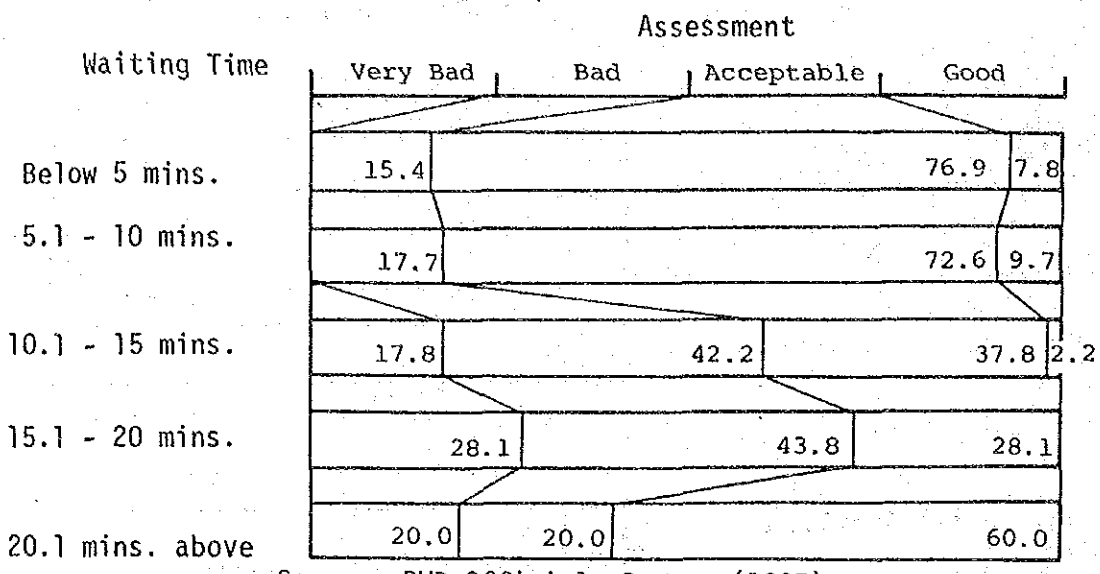
Assessment of Waiting Time at Bus Stop
(Peak Hour)



Source: PWD Officials Survey (1987)

Figure 4.9

Assessment of Waiting Time at Bus Stop
(Off-peak Hours)



Source: PWD Officials Survey (1987)

3) Transfer at Bus Interchange

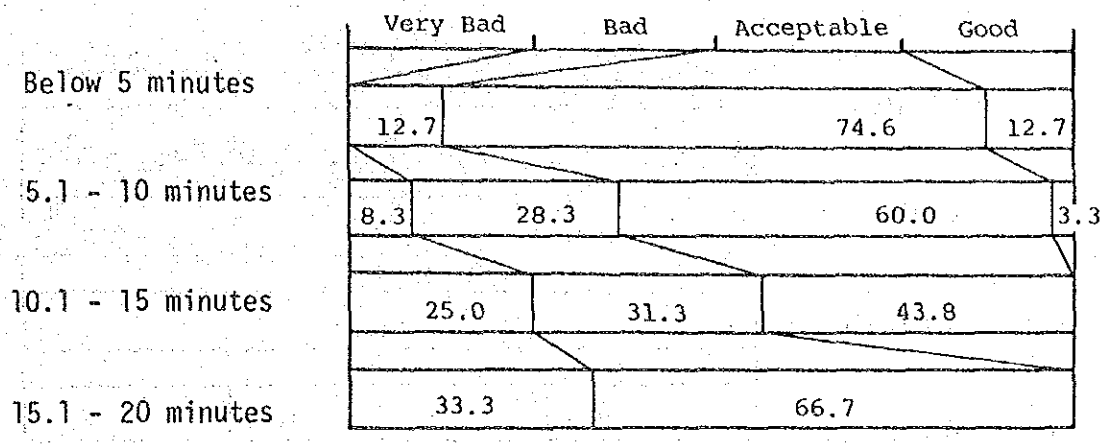
The average waiting time for transfer to feeder bus was 7.1 minutes during peak hours and 10.6 minutes during off-peak hours, while that for transfer to trunk bus was 8.1 minutes during peak hours and 11.6 minutes during off-peak hours. Tolerable waiting time for transfer both to feeder and trunk bus seems to be about 10 minutes, as shown in Figures 4.10 and 4.11.

Transfer and waiting condition at bus interchanges are not fully appreciated by the users, as shown in Figure 4.12, although the majority still consider them acceptable. Environmental condition at the bus interchanges is becoming a concern of the users, as shown in Figure 4.13

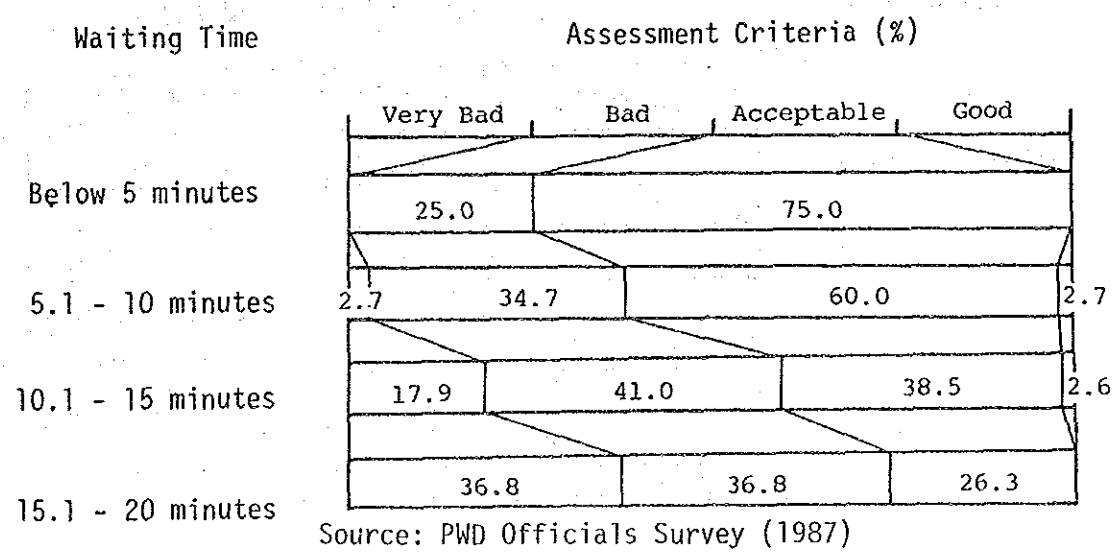
Figure 4.10

Assessment of Waiting Time for Transfer
To Feeder Bus

(Peak Hours)



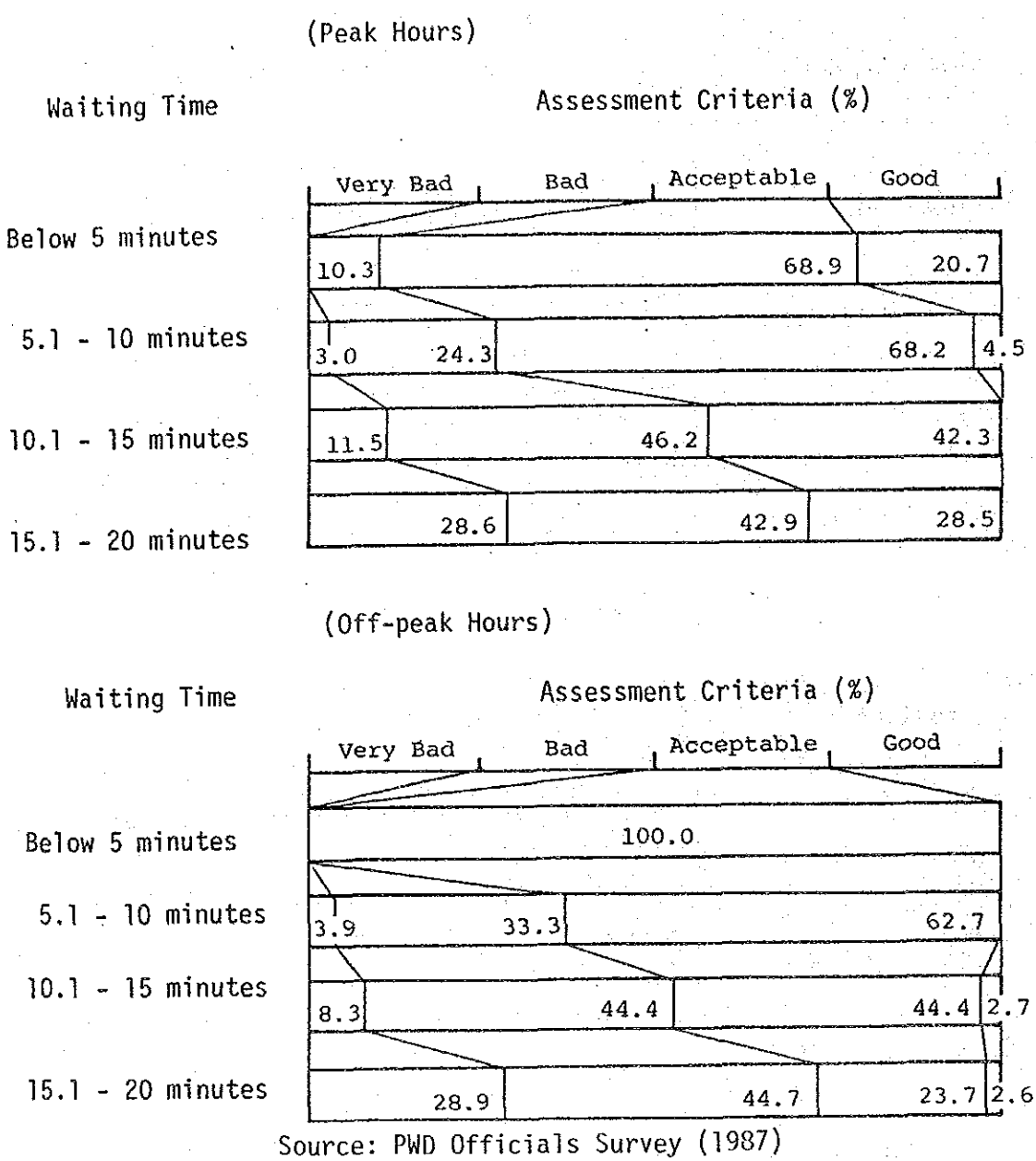
(Off-peak Hours)



Source: PWD Officials Survey (1987)

Figure 4.11

Assessment of Waiting Time for Transfer to Trunk Bus



Source: PWD Officials Survey (1987)

Figure 4.12

Assessment of Transfer and Waiting Condition
at Bus Interchange

Assessment Criteria (%)

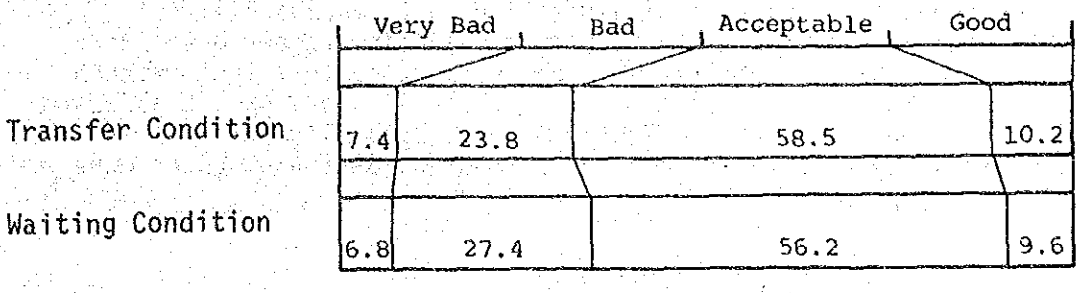
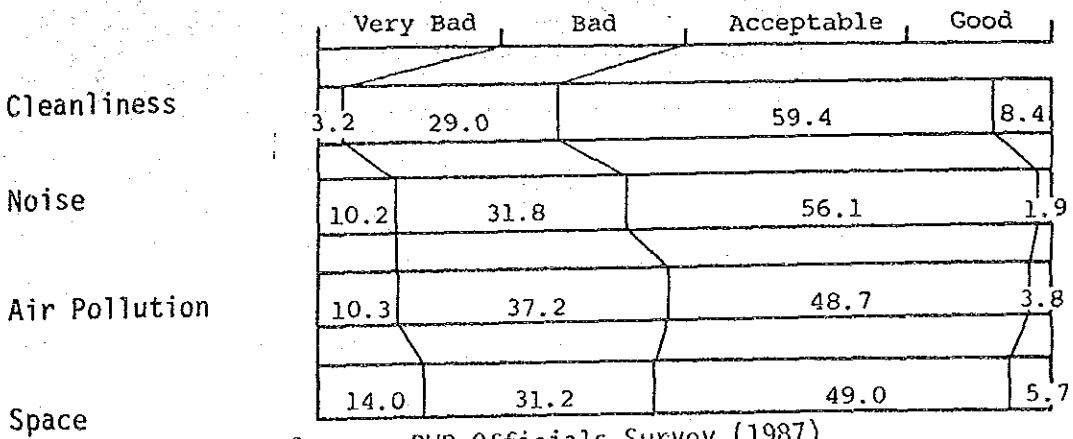


Figure 4.13

Assessment of Environment at Bus Interchange

Items

Assessment Criteria (%)



Source: PWD Officials Survey (1987)

4) Bus Operation

The service frequency of existing feeder bus service was assessed to be acceptable, However, that during off-peak hours is less appreciated as shown in Figure 4.14.

Operation hours of existing feeder bus services are usually for 18 hours from 0530 hours to 2330 hours and some services operate until 0100 Hours next day. However, approximately 30% of the users still want longer operating hours, as shown in Figure 4.15.

Riding condition, including attitude of driver, availability of seat, riding comfort and cleanliness in existing feeder buses, were generally considered acceptable. However, discomfort factors, such as air pollution, noise and heat/temperature in buses, were assessed more negatively, as shown in Figure 4.16. Especially the heat in buses is a big concern. The step and door ~~condition~~ of buses ~~were~~ pose no serious problem.

Figure 4.14

Assessment of Service Frequency

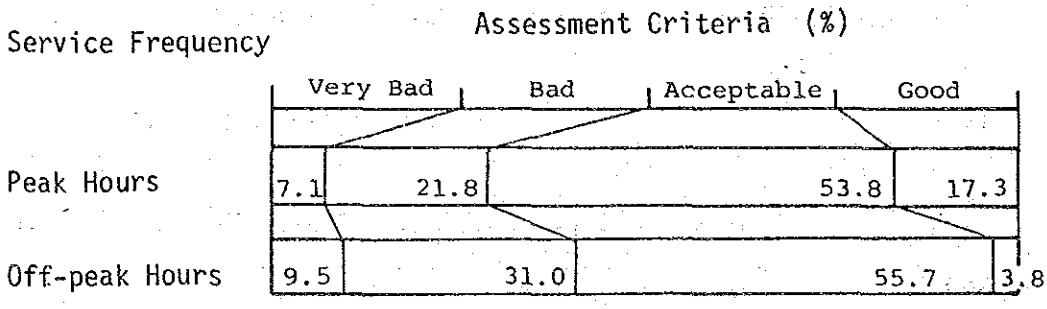
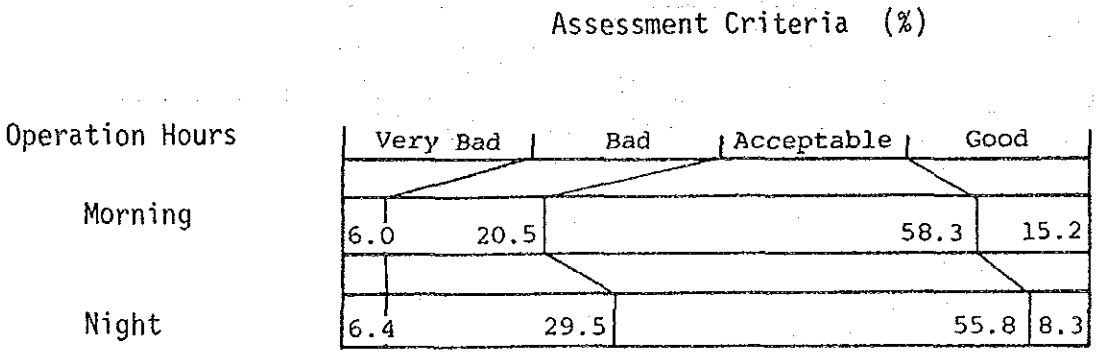


Figure 4.15

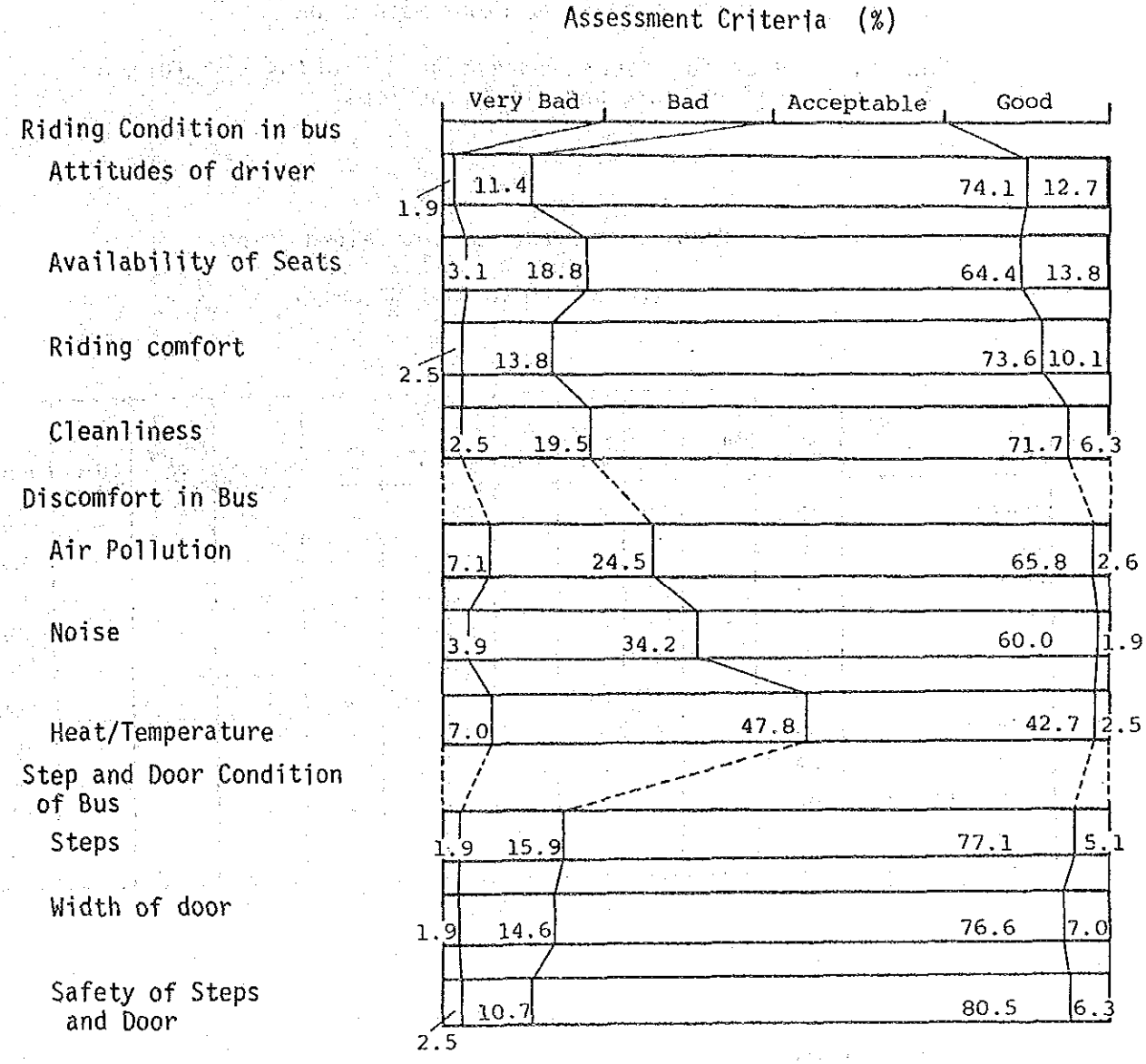
Assessment of Operation Hours



Source: PWD Officials Survey (1987)

Figure 4.16

Assessment of Riding Condition



Source: PWD Officials Survey (1987)

5. OTHER EXISTING FEEDER TRANSPORT MODES

Table 5.1 shows the modal interchange pattern derived from the 1988 HIS survey in Ang Mo Kio new town. As shown in the table, only a few access modes exist, other than the feeder bus. A part of trunk bus service is used as access mode for the MRT or other trunk bus services. Excluding the bus service, the car is the only access mode for the other main mode.

The car is used for access/egress mode, taking the form of "Kiss and Ride" or "Park and Ride" practices.

Table 5.1

Modal Interchange of Inter-Town Trips
of Ang Mo Kio New Town
(From Town to Outside only)

Main Mode \ Access Mode	Walk (Direct)	Motor-cycle	Car	Car-pool	Taxi	MRT	Trunk Bus	Feeder Bus	Scheme B	School/ Company Bus	Others	Total
Motorcycle	100	-	-	-	-	-	-	-	-	-	-	100
Car	99	-	-	-	-	-	-	1	-	-	-	100
Car-pool	87	-	-	-	-	-	-	13	-	-	-	100
Taxi	100	-	-	-	-	-	-	-	-	-	-	100
MRT	54	-	2	-	-	-	3	41	-	-	-	100
Trunk Bus	51	-	-	-	-	-	7	42	-	-	-	100
Feeder Bus	83	-	-	-	-	-	-	17	-	-	-	100
Scheme B	100	-	-	-	-	-	-	-	-	-	-	100
School/Company Bus	98	-	-	-	-	-	-	2	-	-	-	100
Others	100	-	-	-	-	-	-	-	-	-	-	100

Source: SUTIS, 1988 HIS

5.1 Kiss and Ride

Kiss and Ride is a practice in which a person is sent by car to a bus stop/interchange or MRT station from where transfer to a public transport mode is made to continue the trip.

According to the PWD Officials Survey in 1988, 20% of PWD officials practice Kiss and ride. However, 48% seldom do it. Those who do it daily or regularly (daily plus 3-4 days/week) account for only 84% of PWD officials, as shown in Table 5.2.

The same table shows that their purpocse is mainly to/from work (59%) and more than 60% are brought by family members.

Table 5.3 shows a pick-up/drop-off point of "Kiss and Ride" users.

Table 5.2

Practice of Kiss and Ride

Items		No. of Persons	%	%
Usage	Practice	75		20.3
	Do Not Practice	295		79.7
	Total	370		100.0
Frequency per week	5-7 Days	26	34.7	7.0
	3-4 Days	5	6.7	1.4
	1-2 Days	6	8.0	1.6
	Seldom	36	48.0	9.7
	No Answer	2	2.7	0.5
	Total	75	100.0	20.3
Purpose	To/From Work	44	58.7	
	Others	26	34.7	
	No Answer	5	6.7	
	Total	75	100.0	
Driver	Family Member	46	61.3	
	Friend	12	16.0	
	Neighbors	2	2.7	
	Others	10	13.3	
	No Answer	5	6.7	
	Total	75	100.0	

Source: PWD Officials Survey in 1988

Table 5.3

Pick-up/Drop-off Points of Kiss and Ride

	Number	%
MRT Station	12	16.0
Bus Stop/Interchange	17	22.7
Other Place	16	21.3
Total	75	100.0

Source: PWD Officials Survey in 1988

5.2 Park and Ride

Park and Ride is a practice in which a person drives a car to the bus/stop/interchange and then transfers to a public transport to continue the trip. This case is very popular practice in Singapore. According to the PWD Officials Survey in 1987, only 4.4% of the officials or 10.8% of those who belong to car-owning households practiced park and ride. Those who practice it daily or regularly constitute about 2.1% of PWD officials, as shown in Table 5.4.

The purpose is usually to/from work and cars are mostly parked either at fringe car park of the CBD or somewhere outside the CBD.

The park and ride practice is, therefore, not foreseen to increase significantly under the present situation.

Table 5.4

Park and Ride Practice of PWD Officials

Particulars		Percentage		
Frequency	Daily	1.6	4.0	37.0
	3-4 Days	0.5	1.2	11.1
	1-2 Days	0.7	1.6	14.8
	Seldom	1.6	4.0	37.1
	Sub-Total	4.4	10.8	100.0
Main Purpose	To/From Work	-	-	92.6
	Others	-	-	7.4
	Sub-Total	-	-	100.0
Parking Space	Fringe Car Park	-	-	52.4
	Outside CBD	-	-	42.9
	Near Bus Interchange	-	-	4.7
	Sub-Total	-	-	100.0
Car-Owning Households		41.1	100.0	-
Total Respondents		100.0	-	-

Source: PWD Officials Survey, 1987

6. CHARACTERISTICS OF WALK TRIPS

Walk is the largest and most unavoidable feeder mode. However, there has been a dearth of studies or information on the characteristics of walk trips in Singapore. Therefore, the Study Team aimed at obtaining information on the characteristics of walking in various surveys. The results are summarized as follows:

6.1 Walking Time to Transport Facilities

Table 6.1 shows the average walking distance between the nearest MRT station or bus stops and home. It shows that MRT users walk for long distances of 700 - 800 meters, while bus users walk for less than 50 meters.

Table 6.1

Average Walking Distance/Time to Transport Facilities

From Home To	Distance[1/] (m)	Time (min)	Survey Name
MRT Station	705	(10.6)	PWD Officials Survey, 1988
MRT Station	(830)	12.4	Ang Mo Kio HIS Survey, 1988
Bus Stop (Feeder Bus)	(330)	4.9	Ang Mo Kio HIS Survey, 1988
Bus Stop (Trunk & Feeder)	(420-460)	6.3-6.9	PWD Officials

Source: Ang Mo Kio HIS, 1988

1/ Estimated on 4,000m/hour

6.2 Walking Distance/Time for Walk Only Trips

According to the HIS survey in Ang Mo Kio new town, the average walking time or distance for walk only trips within the new town was 16.5 minutes or 1.100 meters. Within the new town, they walk for long distances, although feeder bus services exist.

The other walking distance survey conducted in Orchard Road area showed that the average walking distance of pedestrians is about 600 meters. However, 50% of the pedestrians walk for less than 400 meters as shown in Table 6.3.

Table 6.2

Average Walking Time by Trip Purpose
in Ang Mo Kio New Town (Walk only trips)

Trip Purpose	Average Walking Time (min)	Estimated Walking Distance (m) 1/
To Work	35.5	2,370
To School	16.9	1,130
To Home	16.3	1,090
Part of Business	16.1	1,070
Private	12.5	830
All Purpose	16.5	1,100

Source: Ang Mo Kio HIS, 1988

1/ Estimated based on 4,000m/hour

Table 6.3

Walking Distance of Pedestrians along Orchard and Scotts Road

Items	Distribution of Walking Distance (%)													Average Distance (meters)
	Less than 100 m	100 -199	200 -299	300 -399	400 -499	500 -599	600 -699	700 -799	800 -899	900 -999	1,000 -1499	1,500 -1999	2000 and over	Total	
Trip Purpose															
Shopping	4.2	14.9	13.6	12.8	10.6	5.1	4.4	8.1	4.7	2.5	12.2	3.6	3.2	100	636
Eating/Social	4.2	13.8	15.9	18.6	7.5	4.8	6.6	4.4	2.2	1.8	7.4	4.5	8.4	100	678
Working/Business	9.0	14.7	10.7	13.7	9.0	6.2	7.0	3.9	3.0	5.4	8.0	0.5	1.9	100	503
Going to Work/Home	5.6	23.8	12.1	17.2	13.8	5.5	7.5	2.5	2.2	1.4	4.5	1.2	2.7	100	477
Others	6.6	13.7	14.6	14.4	7.4	9.4	8.5	1.0	5.4	3.4	5.7	1.5	8.4	100	693
Sex															
Male	4.1	13.7	16.2	14.6	9.2	4.5	5.9	6.5	5.3	2.4	8.4	3.4	5.8	100	670
Female	6.3	18.7	12.4	16.2	11.2	6.6	6.5	3.5	2.1	2.5	8.4	2.2	3.4	100	537
Heavy Load															
With Heavy Load	8.2	17.1	14.5	12.6	10.2	6.9	2.2	6.2	4.7	1.4	6.7	7.2	2.1	100	576
Without Heavy Load	5.1	16.4	14.2	15.5	10.1	5.5	6.3	5.0	3.6	2.5	8.5	2.6	4.7	100	603
Total	5.2	16.5	14.3	15.3	10.1	5.6	6.2	5.0	3.7	2.4	8.4	2.8	4.0	100	602

Source: Orchard Area Pedestrian Survey 1988 Expanded Data

6.3 Perception on Walking Distance

According to the PWD Officials Survey in 1988, PWD officials survyed do not mind having to walk for 800 meters between SIA and MND buildings. Moreover, 76% of them can tolerate (1,700m), as shown in Table 6.4. It seems that they accept a fairly long walk. The other question in the same survey shown in Table 6.5 indicates how walking time is perceived. Normally, people do not mind walking for about 5 to 10 minutes. However, if walking time increases to more than 6 minutes, those who feel like disliking it increase gradually. There are no significant differences in the perception between car-owning and non-car-owning households members. The same question was posed on walking distance. It is interesting to note that the answers on the perceived distance do not correspond to the perceived time at all, nor express any statistically meaningful results.

Table 6.4

Perception on Walking Distance for Selected Sections

Section	No Problem	Tolerate	Too Long	Total
SIA - Tanjong Pagar (400m/6 min)1/	300 (81.7)	62 (16.9)	5 (1.4)	367 (100.0)
MND - Tanjong Pagar (600m/9 min)	303 (82.6)	62 (16.9)	2 (0.5)	367 (100.0)
SIA - MND Building (800m/12 min)	270 (73.8)	86 (23.5)	10 (2.7)	366 (100.0)
CK Tang - Centrepoint (1,700m/26 min)	131 (35.8)	148 (40.4)	87 (23.8)	366 (100.0)

Source: 1988 PWD Officials Survey

1/ Walking time is estimated based on 4,000m/hour

Table 6.5

Preferable Walking Distance/Times for To/From Work Trips

Case \ Distance	Less than 100m	100 -199	200 -299	300 -399	400 -499	500 -599	600 -699	700 -799	800 -899	900 -999	1000 and over	Total	Average Distance (meter)
Distance do not mind at all	38.4	19.2	11.1	6.1	10.1	-	1.0	1.0	-	7.0	6.1	100	418
Distance willing to walk	26.3	24.2	9.5	7.4	15.8	1.1	1.1	2.1	-	4.2	8.4	100	439
Distance not want to consider	2.2	10.9	6.5	9.8	13.0	5.4	1.1	-	4.3	28.3	18.5	100	1,022

Case \ Time	1-3 mins	4-5	6-10	11-15	16-20	21-30	31 and over	Total	Average Time (Minutes)
Distance do not mind at all	7.3	41.5	34.8	9.4	3.5	2.0	1.5	100	9.3
Distance willing to walk	4.7	26.5	33.1	17.7	10.2	6.7	1.2	100	11.8
Distance not want to consider	0.6	2.1	15.9	18.9	19.8	29.5	13.3	100	24.4

Source: PWD Officials Survey 1988

6.4 Factors Affecting Walking Distance

Table 6.6 lists what factors affect walking distance. It also shows that weather has a strong influence on walking distance.

Table 6.6

Factors Affecting Walking Distance

Factors	Percentage of Answers
Weather	30.4
Trip Purpose	7.0
Physical Condition	5.7
Environmental Condition	12.7
Shade	13.8
With or Without Companion	3.6
Street Lighting	3.5
Climbing Up and Down Stairs	14.5
Adequacy of Pedestrian Road	6.0
Street Elevation	2.8
Total	100.0

Source: PWD Officials Survey, 1988

Appendix A

INFORMATION ON FEEDER BUS ROUTE AND OPERATION

Route Information of Feeder Bus (1987)

Area	Service	Service Name (Destination)	Roundtrip Distance (km)	No. of Stops served	Roundtrip Running Time(mins)	Average Speed (km/h)	Scheduled Trips	Frequency Peak/Off peak(mins)	Daily Cash Rides	No. of Buses Allocated
Ang Mo Kio	261	Indust'l Park 1	5.13	14	28	11.0	291	3/4.5	19,210	9
	262	Ang Mo Kio Ave 2	9.23	23	40	13.8	143	7.0/8	9,837	6
	263	Indust'l Park II	14.95	42	59	15.2	142	5/9	10,648	9
	265	Ang Mo Kio Ave 10	5.65	14	28	12.1	219	3/5.5	12,050	7
	266	Ang Mo Kio Ave 4/5	7.64	17	32	14.3	217	3/5	10,106	9
	267	Indust'l Park II	7.00	16	26	16.2	162	3.5/7.5	8,451	6
	269	Ang Mo Kio St 61	5.60	15	24	14.0	243	3.5/5	11,535	9
	Total (Average)	7 services	55.20 (7.89)	141	237 (33.9)	(14.0)	1,417	(3.7/6.0)	89,837	55
Bedok	207	Upper Changi Road	8.29	17	27	10.4	33	30/33	367	1
	219	Bedok South Road	10.68	21	46	13.9	84	9/13	4,637	5
	220	Bedok South Ave 3	7.02	14	32	13.2	168	4.5/7	11,238	6
	221	Bedok South Ave 3	4.52	10	21	12.9	201	4/6	20,363	10
	224	Chai Chee Road	14.60	32	50	15.2	85	10.5/13	3,903	6
	225	Bedok North St 3	3.51	10	21	10.0	223	3/5	20,636	11
	226	Bedok Reservoir Rd	7.58	14	30	15.2	183	4/6	11,436	7
	227	Bedok North Depot	7.50	21	34	13.4	15.3	4.5/8	8,585	6
	228	Bedok Reservoir Rd	10.71	24	40	16.1	164	4.5/8	12,047	7
	229	Chai Chee Street	3.95	9	21	11.3	193	4/6	9,611	5
	Total (Average)	10 services	78.52 (7.85)	172	330 (33.0)	(14.3)	1,487	(5.0/7.8)	102,823	64
Bukit Batok	361	Bukit Batok West Ave 6	4.29	12	17	15.1	137	7/8	2,041	2
	365	Bukit Batok St 34	5.03	16	24	14.6	186	4/6.5	6,594	5
	366	Bukit Batok Depot	5.32	14	23	13.9	95	10/12.5	1,030	2
	367	Bukit Batok West	5.00	14	20	15.0	243	3/4.5	9,636	6
	Total (Average)	4 services	20.44 (5.11)	56	84 (21)	(14.6)	661	(4.8/6.9)	20,101	15
Bukit Merah	271	Telok Blangah Cres.	2.81	9	17	9.9	155	5/7.5	4,260	3
	272	Telok Blangah Rise	4.12	13	21	11.8	170	4.5/6.5	5,297	4
	273	Telok Blangah Ht.	4.25	12	21	12.1	217	3/5.5	9,647	6
	274	Depot Road	4.55	12	21	13.00	240	3/5	8,209	5
	275	Bukit Purmei Ave	4.32	10	24	10.8	147	5.5/8	6,623	4
	Total (Average)	5 services	20.05 (4.01)	56	104 (20.8)	(11.6)	929	(3.9/6.3)	34,044	22
Clementi	282	Clementi Ave 5	2.34	6	30	4.7	82	9/12	1,002	1
	284	Clementi Ave 4	1.85	5	20	5.6	120	7.5/8.5	4,285	2
	285	Pandan Loop	8.02	20	33	14.6	77	11/14	3,685	3
	287	Clementi West St 2	4.72	11	29	9.8	119	8.5/9.5	5,811	3
	Total (Average)	4 services	16.93 (4.23)	42	112 (28.0)	(9.1)	406	(8.8/10.6)	14,783	9
Hougang	321	Lorong Ah Soo	5.76	16	27	12.8	199	3.5/6	12,713	6
	322	Hougang Ave 2	8.72	21	41	12.8	182	4/6.5	15,322	8
	323	Hougang Ave 5/7	6.34	14	28	13.6	72	14/16	2,258	2
	327	Hougang Ave 7	6.60	14	28	14.1	126	7/9.5	5,965	4
	328	Hougang Ave. 8	7.41	17	35	12.7	120	7/9.5	1,657	4
	Total (Average)	5 services	34.83	82	159 (31.8)	(13.1)	699	(5.6/8.4)	37,915	24
Jurong East	333	Jurong East St 32	6.54	15	29	13.5	184	4.5/6.5	9,056	6
	334	Jurong West St 42	9.67	25	38	15.3	204	4/5.5	18,455	8
	335	Jurong West St 52	9.46	24	30	18.9	164	4.5/7.5	5,257	6
	336	Jurong West St 41	10.09	25	33	18.3	169	4.5/7	6,363	7
	Total (Average)	4 services	35.76 (8.94)	89	130 (32.5)	(16.5)	721	(4.4/6.5)	39,131	27

Area	Service	Service Name (Destination)	Roundtrip Distance (km)	No. of Stops Served	Roundtrip Running Time(mins)	Average Speed (km/h)	Scheduled Trips	Frequency Peak/Off Peak(mins)	Daily Cash Rides	No. of Buses Allocated
Jurong West	240	Boon Lay Garden	12.49	34	56	13.4	176	5/6.5	20,356	11
	241	Teban Garden	10.87	23	39	16.7	146	5.5/8	7,807	8
	242	Kang Ching Road	5.82	19	31	11.3	171	4.5/7	8,125	6
	244	Boon Lay Garden	8.42	24	41	12.3	176	4/7.5	11,567	7
	245	Pandan Road	19.30	41	52	22.4	60	13/10.5	2,235	4
	246	Boon Lay Garden	17.87	50	60	17.9	75	8.5/14.5	3,764	6
	Total (Average)	6 services	74.05 (12.48)	191	279 (46.5)	(16.1)	804	(5.7/8.9)	61,954	42
Queenstown	203	Commonwealth Dr. (Hargaret Drive)	5.99	14	21	17.1	84	10.5/12.5	610	2
	212	Buona Vista (Dover Avenue)	7.23	18	31	14.0	73	8/9.5	1,679	4
	Total (Average)	2 services	13.22 (6.61)	32	52 (26.0)	(15.3)	157	(9.1/10.8)	2,297	6
Serangoon	312	Upp Serangoon Rd	3.45	9	14	14.8	73	14/14.5	952	1
	315	Serangoon North Avenue 1	5.35	14	22	14.6	114	7.5/10.5	2,564	3
	Total (Average)	2 services	8.80 (4.40)	23	36 (18.0)	(14.7)	187	(9.8/12.2)	3,516	4
Tampines	290	Simei Estate	9.18	21	38	14.5	58	16.5/20	1,439	2
	292	Tampines St 22	3.40	9	17	12.0	222	4/5.5	5,904	4
	293	Tampines St 81	3.08	10	14	15.8	228	3.5/6	8,278	4
	294	Tampines St 21	5.72	15	19	18.1	260	3/5	11,003	6
	297	Tampines St 42	5.22	14	21	14.9	243	3.5/5	8,493	6
	Total (Average)	5 services	26.60 (5.32)	69	109 (21.8)	(14.6)	1,011	(4.1/6.3)	35,117	22
Toa Payoh	231	Toa Payoh Lor 1/4	4.41	10	21	12.6	205	3.5/6.5	10,051	10
	232	Toa Payoh Lor 2/6	4.97	11	23	13.0	190	4.5/7.5	10,069	8
	235	Toa Payoh Lor 5	5.21	11	22	14.2	120	7/11	3,099	3
	237	Toa Payoh Lor 7	4.06	10	20	12.2	171	6/7.5	4,370	3
	238	Toa Payoh Lor 8	6.77	18	29	14.0	199	4.5/6	11,132	6
	Total (Average)	5 services	25.42 (5.08)	60	115 (23.0)	(13.3)	885	(4.8/7.4)	47,521	30
Woodlands	372	Marsiling Road	5.15	11	17	18.2	145	6/8	6,800	3
	900	Woodlands Ave 3	5.68	11	18	18.9	160	9/13	7,500	3
	Total (Average)	2 services	10.83 (5.42)	22	35 (17.5)	(18.6)	305	(7.2/9.9)	14,300[1/]	6
Yishun	800	Yishun Ave 5, Sembawang Road	6.74	17	24	16.8	161	10/15	4,600	4
			8.99	22	26	20.7	134	8/12	11,800	4
	810	Yishun Ave 7	8.99	22	26	20.7	134	8/12	11,800	4
	802	Yishun Ring Road, Ave 3	7.70	15	26	17.8	131	6.5/8.5	9,000	4
	803	Yishun St 61, Ave 4	4.55	9	17	16.4	122	8.5/15.5	1,200	2
	804	Yishun Ring Road, Ave 11	6.30	12	18	20.6	108	8.5/17	200	2
	Total (Average)	5 services	34.25 (6.85)	75	111 (22.2)	(18.5)	656	(8.1/12.8)	26,800[1/]	16
New Town	Total (Average)	65 services	455.70 (6.9)	1,110	1,893 (28.7)	(14.4)	10,325	(5.1/7.8)	530,139	342

1/ Averate daily passengers.

(Other than HDB New Town)

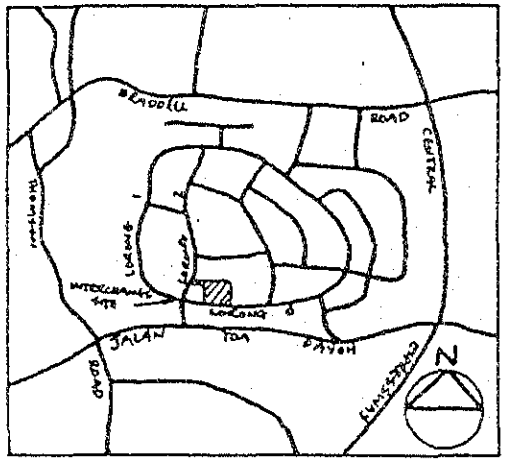
Area	Service	Service Name (Destination)	Roundtrip Distance (km)	No. of Stops Served	Roundtrip Running Time(mins)	Average Speed (km/h)	Scheduled Trips	Frequency Peak/Off Peak	Daily Cash Rides (persons)	No. of Buses	
Jurong Industrial Area	247	Jurong West (Jurong Pier Rd)	6.87	19	29	14.2	131	7/9.5	2,324	4	
	248	(Neythal Rd)	9.26	24	32	17.4	79	10/14	1,609	3	
	249	(Jln Samalun)	11.47	26	35	19.7	115	8/12	1,096	4	
	250	(Sixth Lokyang Rd)	9.92	20	31	19.2	130	6/9.5	3,181	5	
	251	(Refinery Rd)	17.61	36	45	23.5	98	7.5/13	2,584	5	
	252	(Gul Circle)	10.29	22	52	21.1	73	8.5/14.5	2,524	5	
	253	(Benoi Rd)	15.93	30	41	23.3	61	10/8	2,279	3	
	254	(Tuas Rd)	25.53	35	64	23.9	60	11/10.5	1,936	5	
	255	(Gul Crescent)	17.45	26	43	24.3	76	7.5/14	2,547	5	
	257	(Gul Rd)	23,36	32	55	25.5	53	12/20	1,796	4	
	Total (Average)	10 services	155.69 (15.57)	270	427 (42.7)	(21.9)	876	(8.4/12.3)	22,756	43	
HDB Estate	211	Marine Parade (East Coast Rd)	7.84	22	26	18.1	70	13.5/15	962	2	
	382	Eunos (Ubi Avenue 1)	7.55	17	32	14.1	102	9.5/11	4,561	3	
	Total (Average)	2 services	15.39 (7.70)	39	58 (29.0)	(15.9)	172	(11.2/12.6)	5,523	5	
Other Area	205	Clementi (Jln Anak Bukit)	12.67	28	43	17.7	79	10/14.5	2,715	4	Residencial
	213	Marine Parade (Opera Estate)	4.44	15	13	20.5	109	13/14.5	339	1	"
	214E	Seletar East Camp Jalan Kayu	2.56	9	10	15.4	89	10/11.5	383	1	"
	214W	(West Camp Rd) Kent Ridge Rd	7.38	16	10	44.3	52	10/17.5	736	2	"
	216	(Commonwealth Ave) Serangoon Garden	11.76	26	40	14.7	117	4/6.5	1,937	11	University
	217	(Tavistock Ave) Woodlands Interchange	3.42	15	12	17.1	102	4/6.5	2,590	3	Residencial
	925	Industrial Estate	27.25	64	57	28.7	55	13/18	2,200	5	Industrial
	Total (Average)	7 services	69.48 (9.93)	173	193 (27.6)	(21.6)	683	(7.3/10.8)	10,908	27	
Other than HDB New Town	Total (Average)	19 services	240.56 (11.85)	482	678 (35.7)	(21.3)	1,731	(8.0/11.6)	39,187	25	
Grand Total (Average)		84 services	696.26 (8.2)	1,592	2,571 (30.2)	(16.2)	12,056		569,326	417	

Source: SBS, TIBS

Appendix B

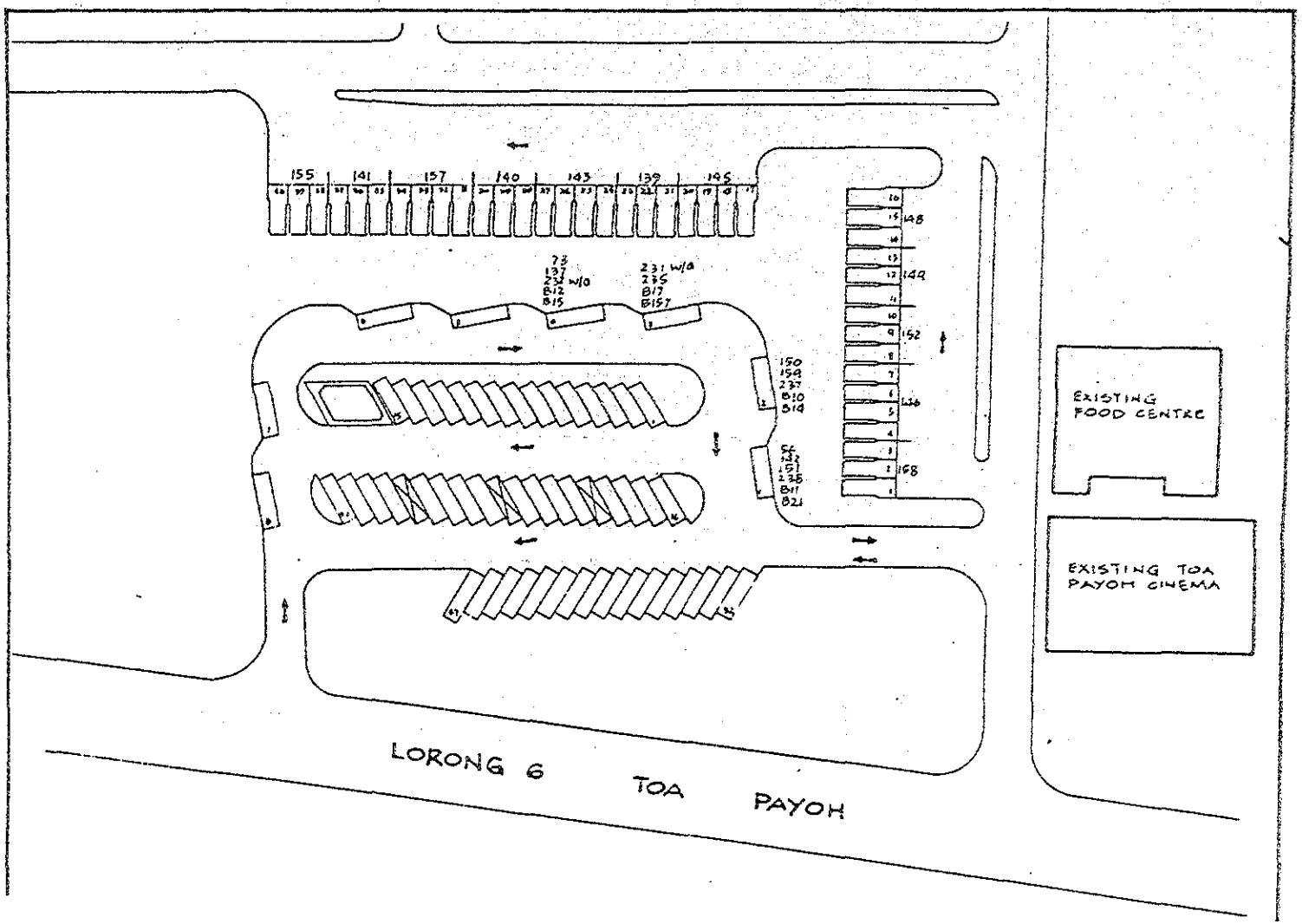
Layout of Bus Interchange

Source: SBS

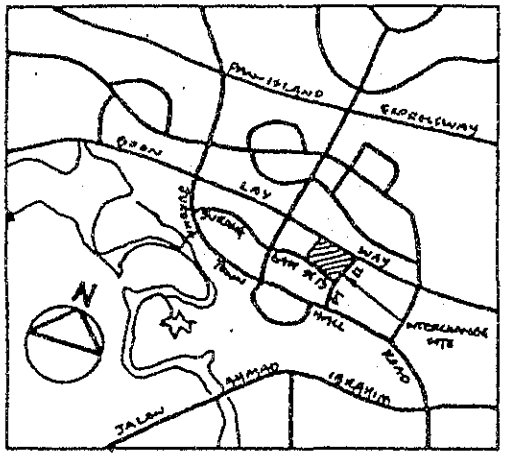


TOA PAYOH INTERCHANGE

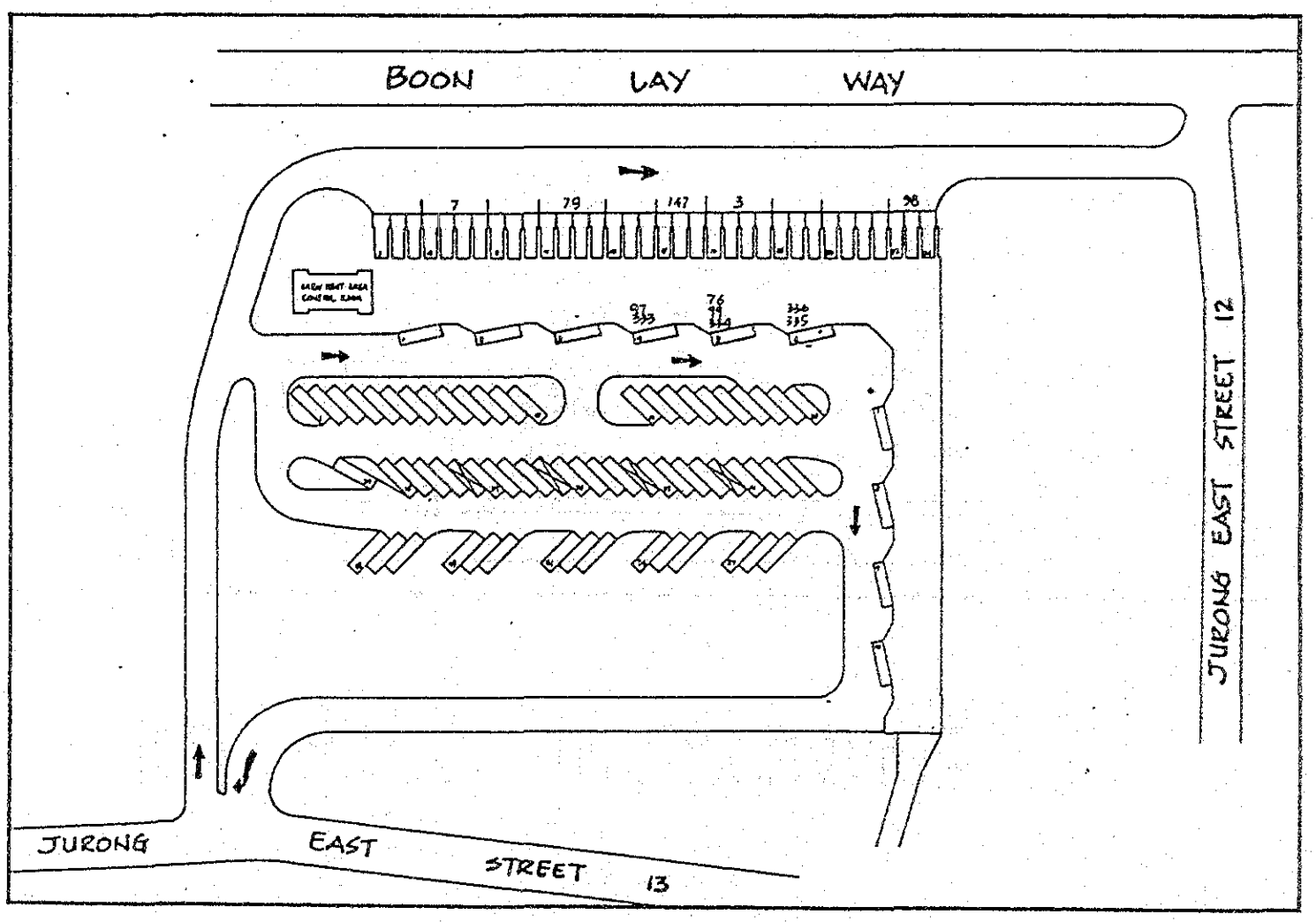
No. of Bays Available	:	87
End-on Berths	:	40
Sawtooth Berths	:	8
Layover Bays	:	47
No. of Services	:	32
Trunk Services	:	27
Feeder Services	:	5



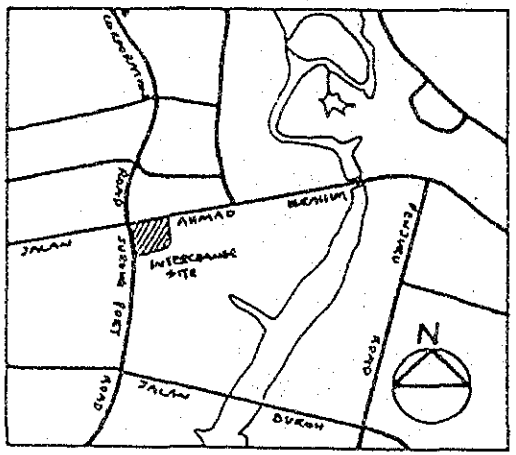
JURONG EAST INTERCHANGE

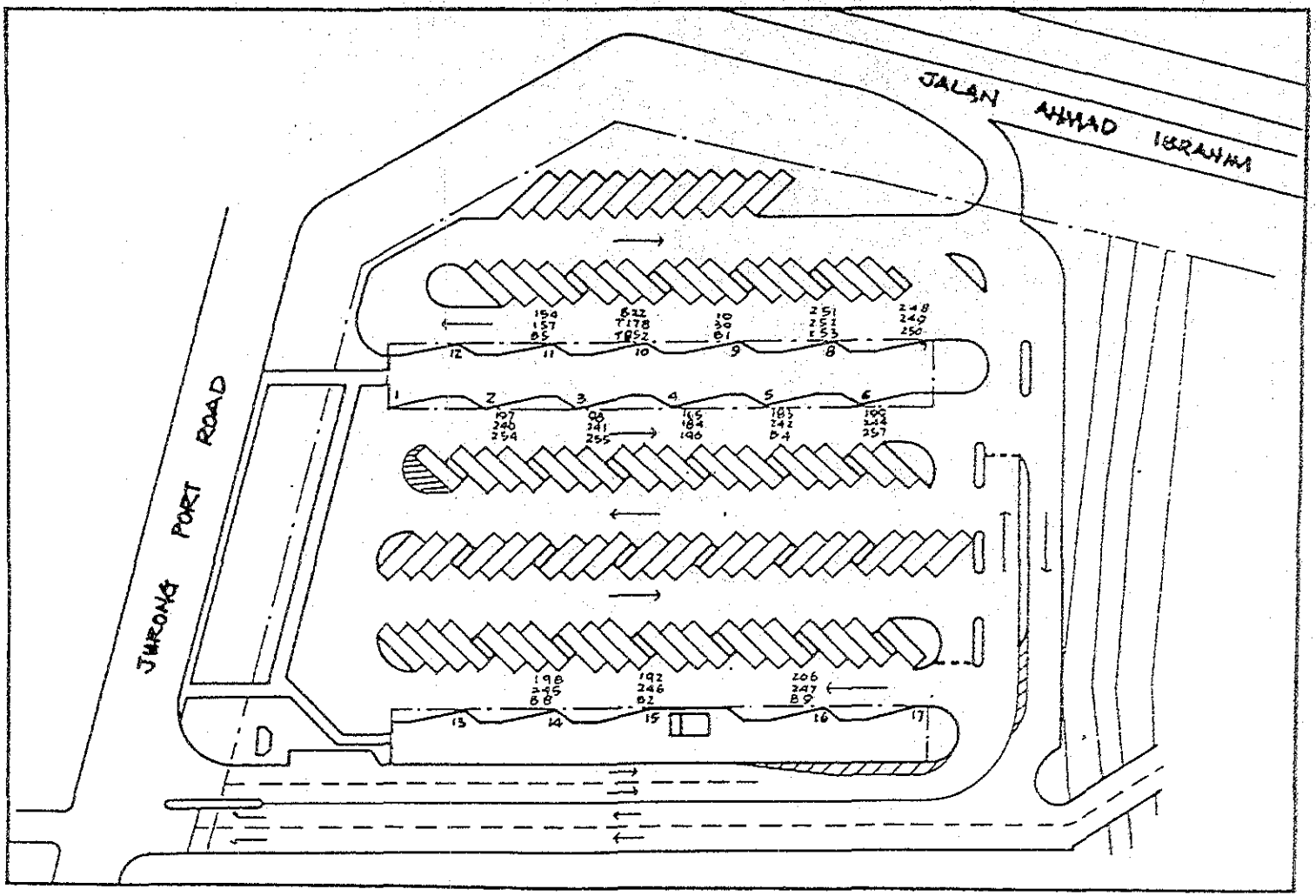


No. of Bays Available	:	90
End-on Berths	:	34
Sawtooth Berths	:	10
Layover Bays	:	56
No. of Services	:	12
Trunk Services	:	8
Feeder Services	:	4

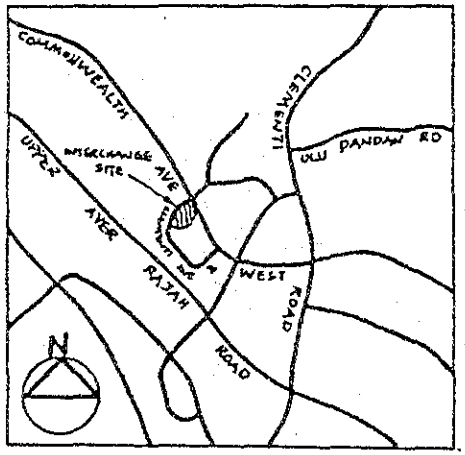


JURONG INTERCHANGE



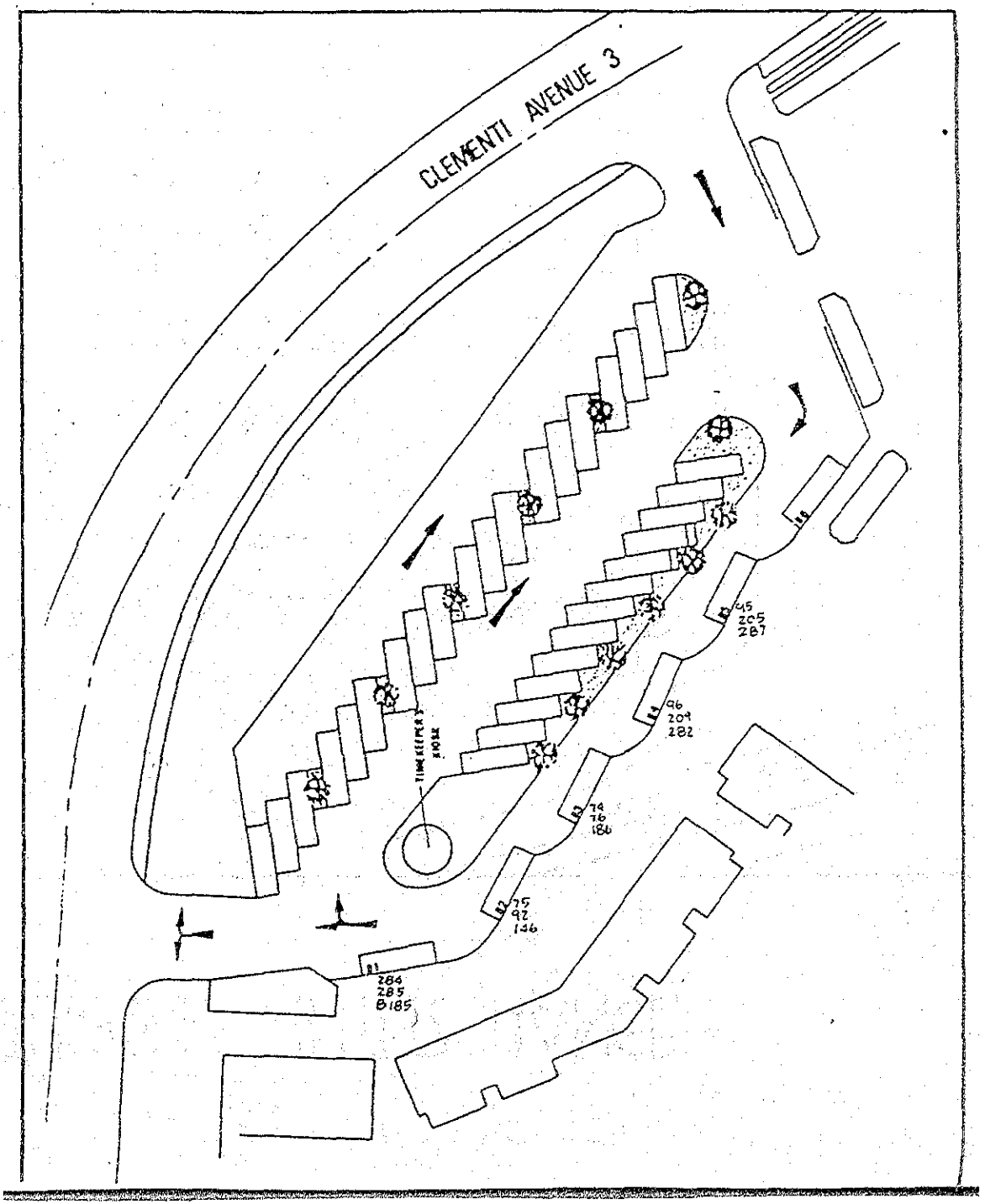


No. of Bays Available	:	90
End-on Berths	:	
Sawtooth Berths	:	17
Layover Bays	:	90
No. of Services	:	39
Trunk Services	:	23
Feeder Services	:	16

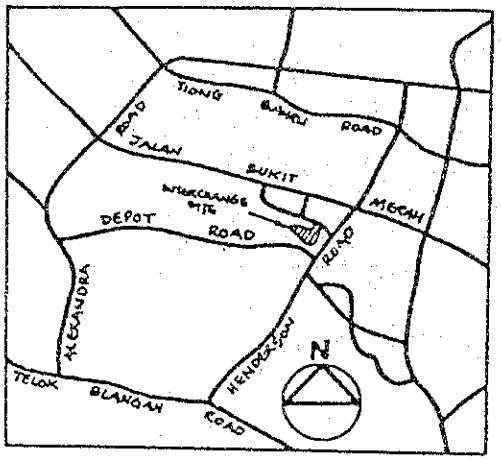


CLEMENTI INTERCHANGE

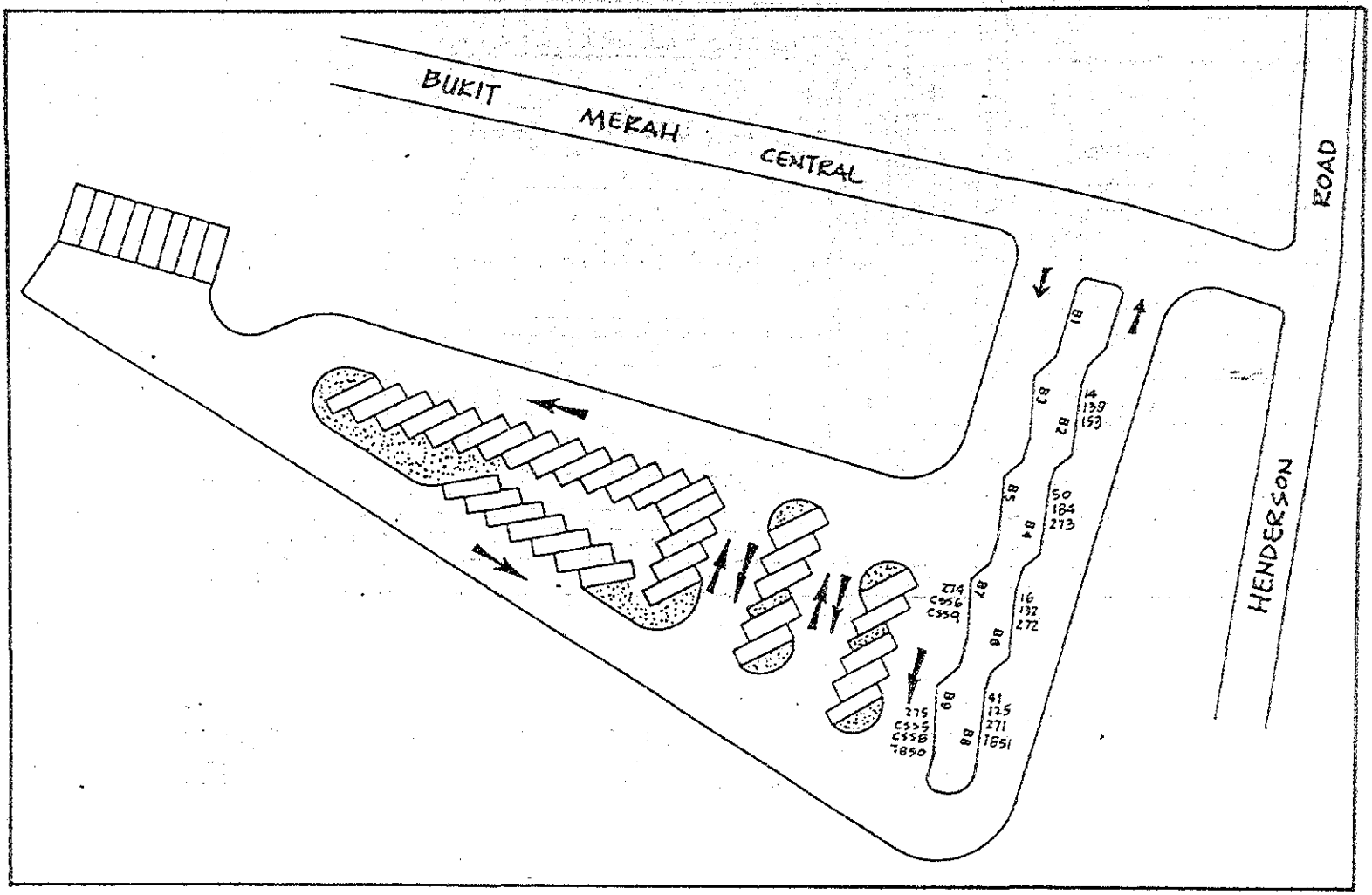
No. of Bays Available	:	32
End-on Berths	:	
Sawtooth Berths	:	6
Layover Bays	:	32
No. of Services	:	15
Trunk Services	:	11
Feeder Services	:	4

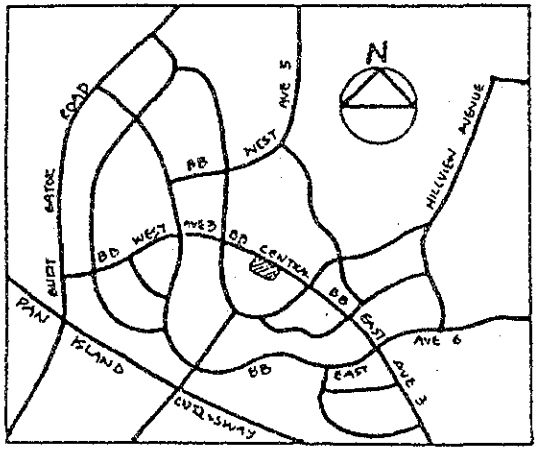


BUKIT MERAH INTERCHANGE

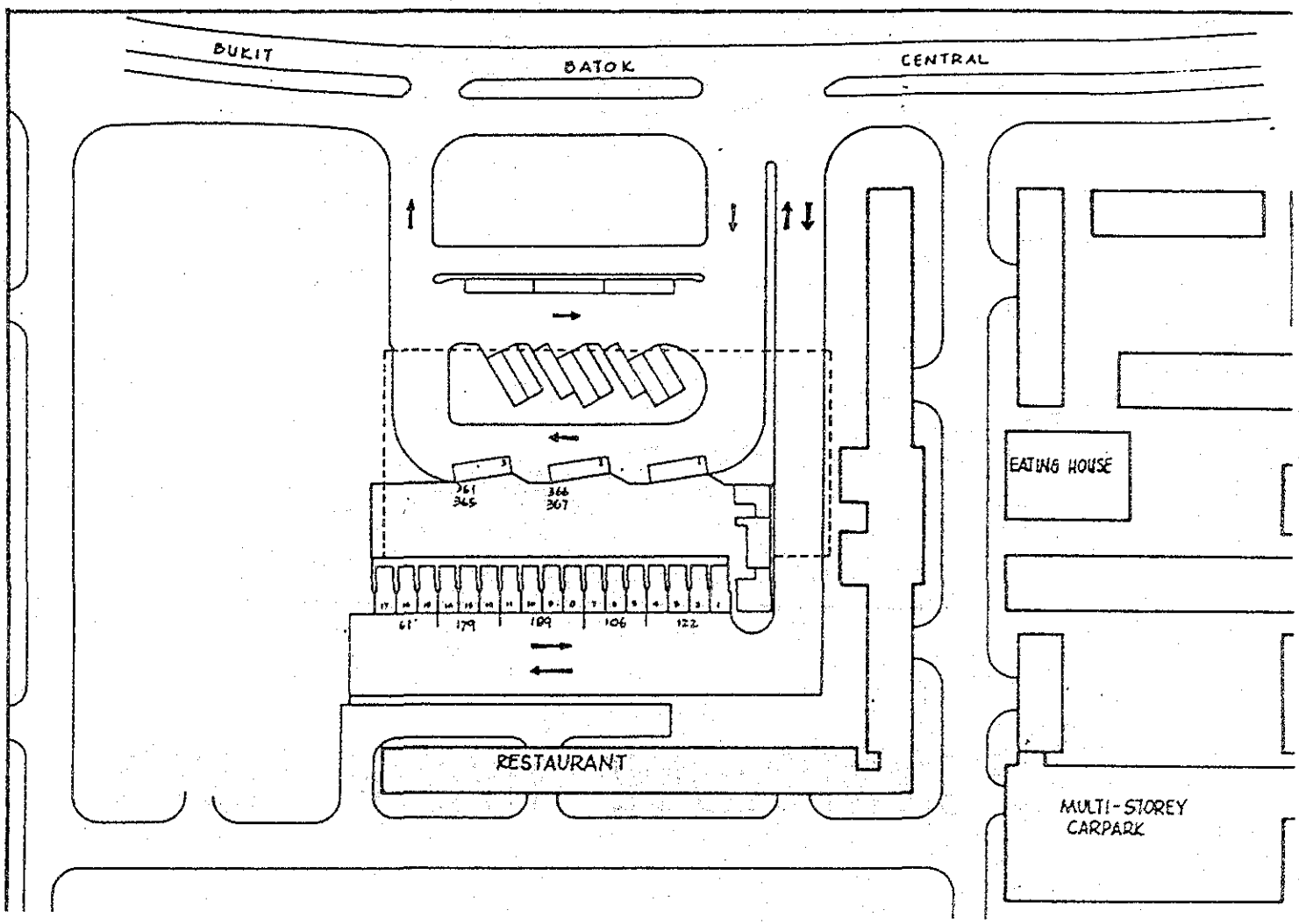


No. of Bays Available	:	43
End-on Berths	:	
Sawtooth Berths	:	9
Layover Bays	:	43
No. of Services	:	21
Trunk Services	:	16
Feeder Services	:	5





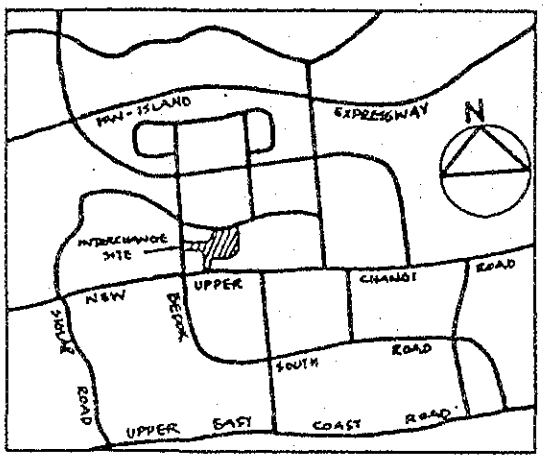
BUKIT BATOK INTERCHANGE



No. of Bays Available : 28
End-on Berths : 17
Sawtooth Berths : 3
Layover Bays : 11

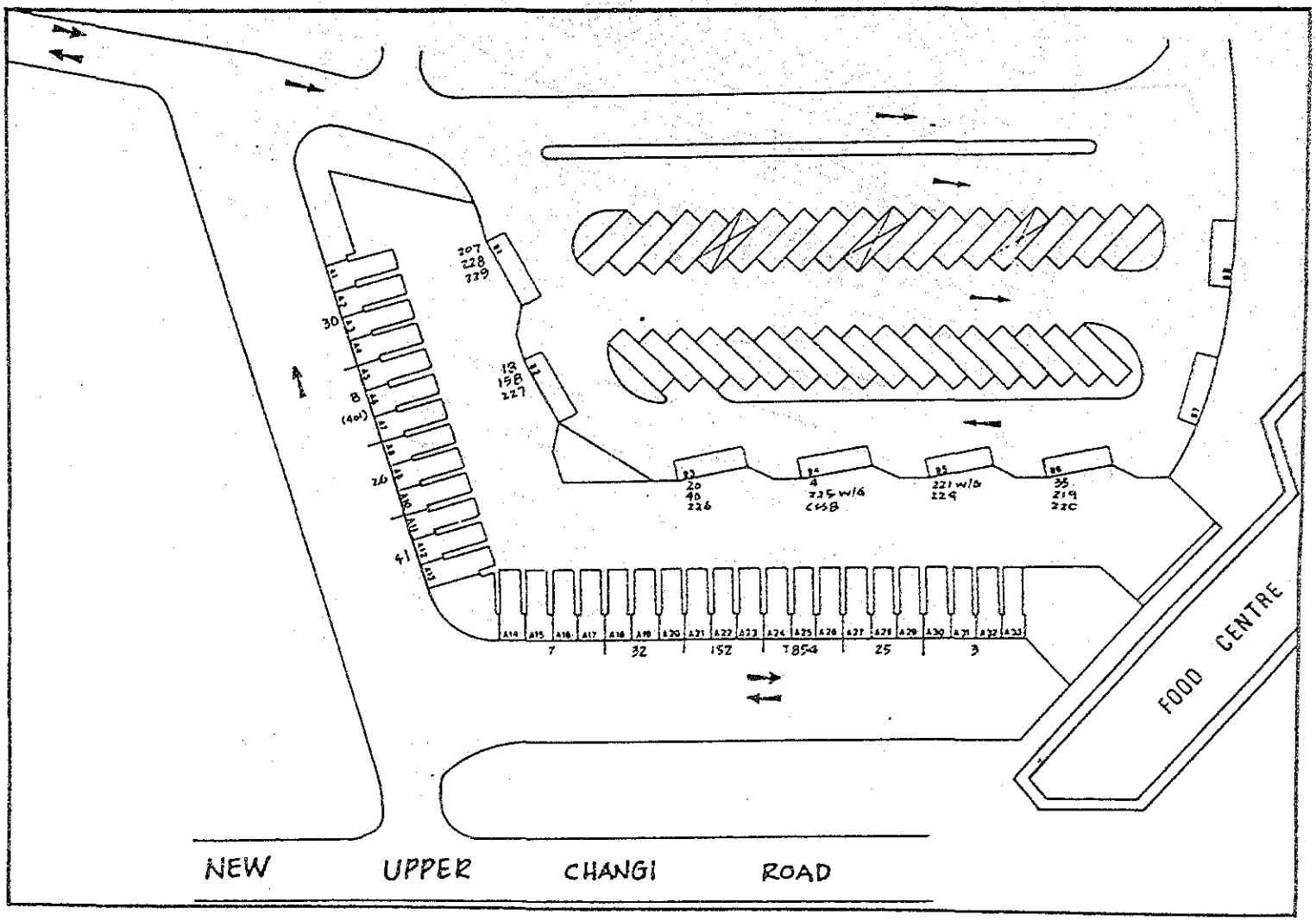
No. of Services : 9
Trunk Services : 5
Feeder Services : 4

BEDOK INTERCHANGE

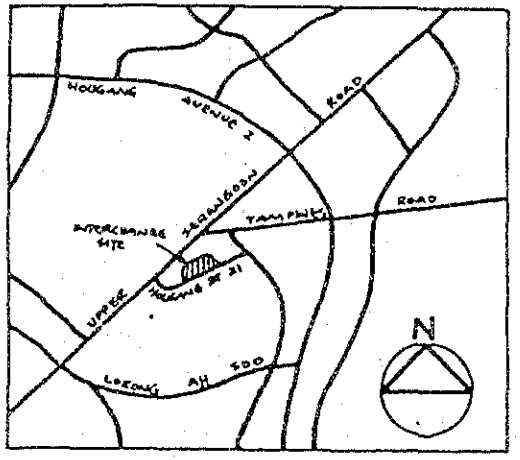


No. of Bays Available : 72
End-on Berths : 33
Sawtooth Berths : 8
Layover Bays : 39

No. of Services : 28
Trunk Services : 19
Feeder Services : 9



HOUGANG INTERCHANGE



No. of Bays Available	:	55
End-on Berths	:	28
Sawtooth Berths	:	6
Layover Bays	:	27
No. of Services	:	10
Trunk Services	:	5
Feeder Services	:	5