DHAKA TRANSPORT COORDINATION BOARD (DTCB)
MINISTRY OF COMMUNICATIONS (MOC)
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

PREPARATORY SURVEY REPORT
ON
DHAKA URBAN TRANSPORT NETWORK DEVELOPMENT STUDY (DHUTS) IN BANGLADESH

FINAL REPORT
(APPENDIX VOLUME)

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JAPAN INTERNATIONAL COOPERATION AGENCY

Katahira & Engineers International
Oriental Consultants Co., Ltd.
Mitsubishi Research Institute, Inc.

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DHAKA URBAN TRANSPORT NETWORK DEVELOPMENT STUDY
FINAL REPORT
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APPENDIX 1: TRAFFIC SURVEY

1.1 Introduction

(1) Zoning System

In order to analyze the characteristics of study area, other 2 zoning systems are established: "B Zone" and "A Zone". Since the zones in DCC are subdivided into 90 zones (90 Wards), a larger zoning system has been set at B Zone with 56 zones including 38 zones in DCC. As the largest system, A Zone is also developed with 19 zones in RAJUK area. Table 1.1-1 summarizes the study's zoning system and converted numbers among three zoning systems.

Table 1.1-1 Zoning System for Traffic Analysis

Zoning Classification	No. of Zones	Purpose
A Zone	19	To analyze both urban analysis and traffic characteristics at macro level
B Zone	56	To analyze traffic characteristics at macro level
C Zone	371	To do traffic assignment, especially aiming at analyzing transit corridor

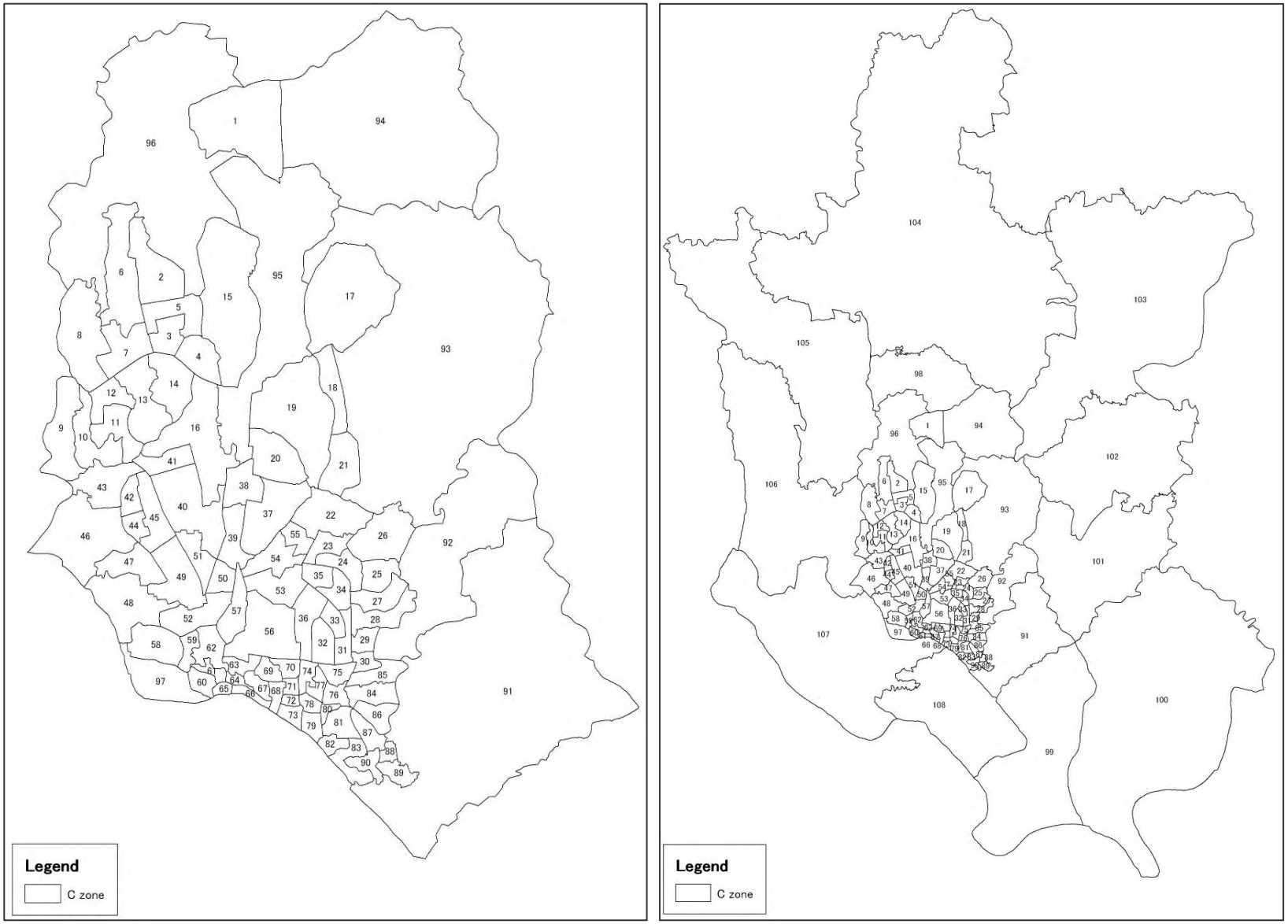


Figure 1.1-1 Zoning System in DHUTS (C zone)

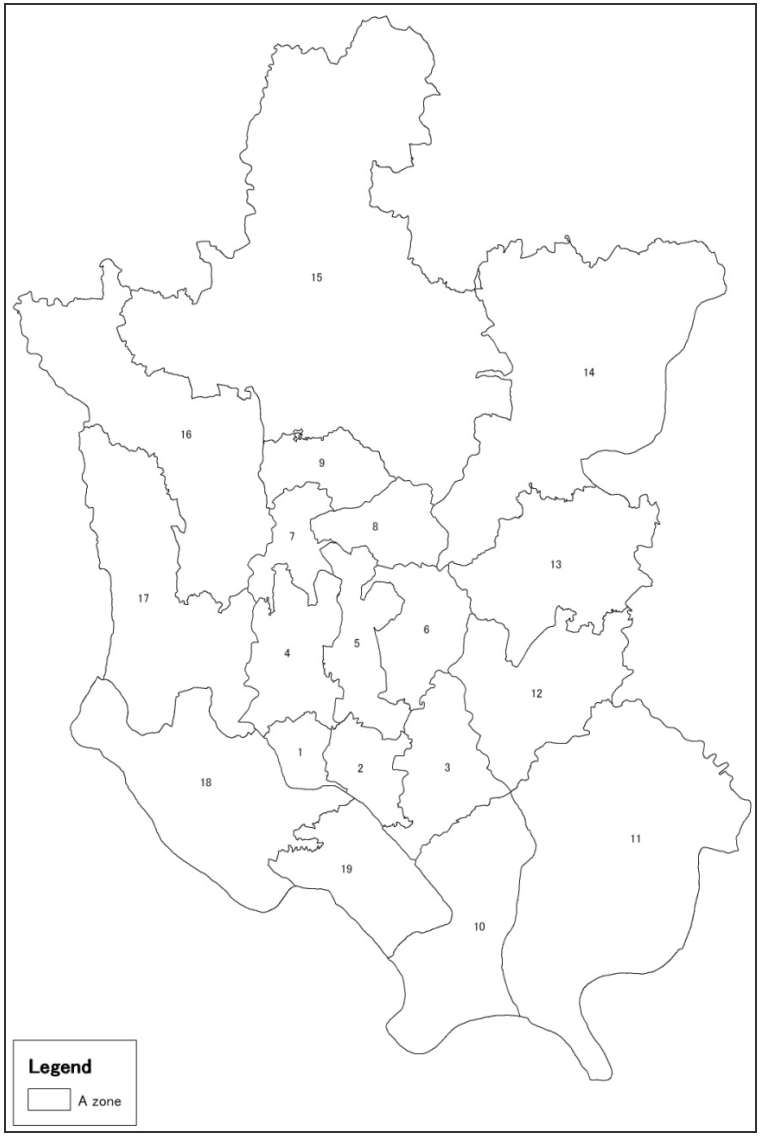


Figure 1.1-2 Zoning System in DHUTS (A zone)

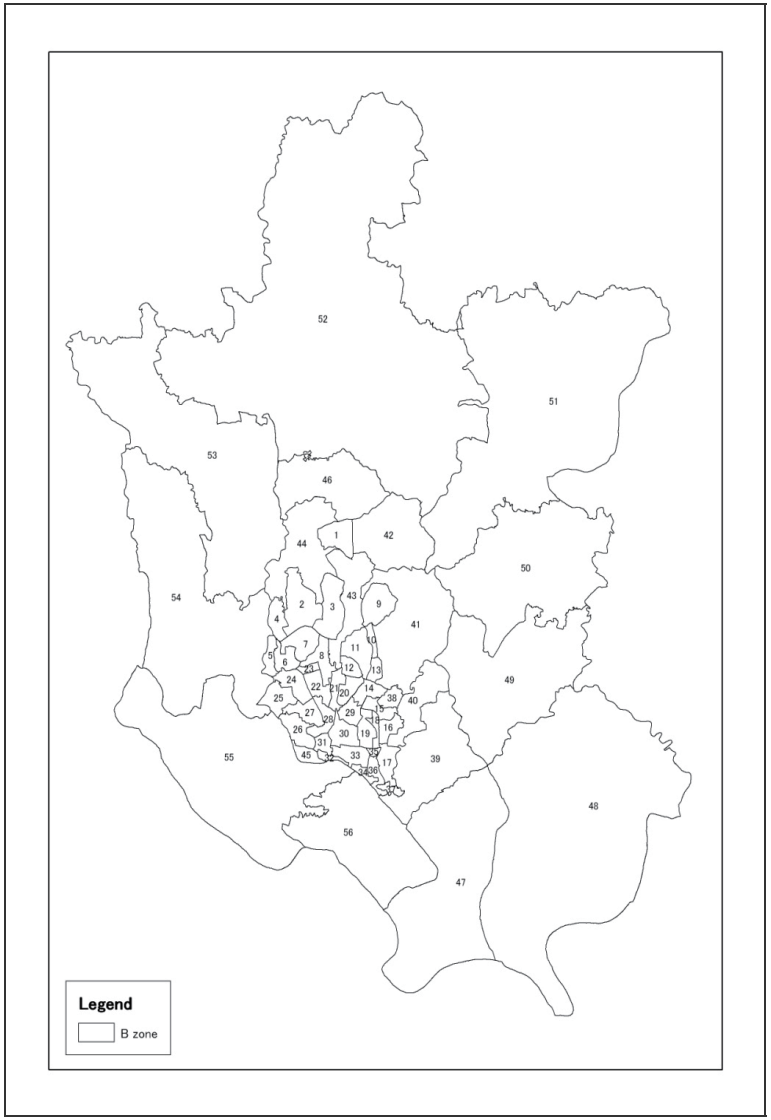


Figure 1.1-3 Zoning System in DHUTS (B Zone)

Table 1.1-2 Zoning System

C Zone	B Zone	A Zone	Area	C Zone	B Zone	A Zone	Area	C Zone	B Zone	A Zone	Area
1	1	8	DCC	37	20	5	DCC	73	34	2	DCC
2	2	4	DCC	38	21	4	DCC	74	33	2	DCC
3	2	4	DCC	39	21	4	DCC	75	35	2	DCC
4	3	4	DCC	40	22	4	DCC	76	36	2	DCC
5	2	4	DCC	41	23	4	DCC	77	33	2	DCC
6	2	4	DCC	42	24	4	DCC	78	33	2	DCC
7	2	4	DCC	43	24	4	DCC	79	34	2	DCC
8	4	4	DCC	44	24	4	DCC	80	36	2	DCC
9	5	4	DCC	45	24	4	DCC	81	36	2	DCC
10	6	4	DCC	46	25	4	DCC	82	34	2	DCC
11	6	4	DCC	47	27	1	DCC	83	36	2	DCC
12	7	4	DCC	48	26	1	DCC	84	17	2	DCC
13	7	4	DCC	49	27	1	DCC	85	17	2	DCC
14	7	4	DCC	50	28	1	DCC	86	17	2	DCC
15	3	4	DCC	51	28	1	DCC	87	17	2	DCC
16	8	4	DCC	52	28	1	DCC	88	17	2	DCC
17	9	5	DCC	53	29	2	DCC	89	37	2	DCC
18	10	5	DCC	54	29	2	DCC	90	37	2	DCC
19	11	5	DCC	55	14	5	DCC	91	39	3	DMA
20	12	5	DCC	56	30	2	DCC	92	40	3	DMA
21	13	5	DCC	57	30	2	DCC	93	41	6	DMA
22	14	5	DCC	58	26	1	DCC	94	42	8	DMA
23	15	5	DCC	59	31	1	DCC	95	43	5	DMA
24	15	5	DCC	60	32	1	DCC	96	44	7	DMA
25	15	5	DCC	61	31	1	DCC	97	45	1	DMA
26	38	5	DCC	62	31	1	DCC	98	46	9	RAJUK
27	16	2	DCC	63	33	2	DCC	99	47	10	RAJUK
28	16	2	DCC	64	33	2	DCC	100	48	11	RAJUK
29	16	2	DCC	65	32	1	DCC	101	49	12	RAJUK
30	17	2	DCC	66	32	1	DCC	102	50	13	RAJUK
31	18	2	DCC	67	33	2	DCC	103	51	14	RAJUK
32	19	2	DCC	68	33	2	DCC	104	52	15	RAJUK
33	19	2	DCC	69	33	2	DCC	105	53	16	RAJUK
34	18	2	DCC	70	33	2	DCC	106	54	17	RAJUK
35	19	2	DCC	71	33	2	DCC	107	55	18	RAJUK
36	19	2	DCC	72	33	2	DCC	108	56	19	RAJUK

1.2 Household Interview Survey (HIS)

1.2.1 Detail Survey Method

Table 1.2-1a, and Table 1.2-1b shows interview survey question form and targeted sample households and collected samples.

Table 1.2-1.a Sample Size and Accomplishment

Household Interview Survey

Section 5 : Attitudinal Questions

[Note: These questions are to be asked to the head / mian income earner of the household]

Sample Number: | | | | | | | |

1. Household Person No. (as given in Section 2) — Male | Female

2. Are daily trips made to a work site? (encircle yes/no) Yes ☐ No ☐

   A How many times per week do you travel to and from your work place (round trips / week)

   B How far is your work place from your residence (0.0 km)?

   C How much time (hour and minutes) does it take you to travel from your resdience to place of work?

	Hours	Minutes
1 typcial		
2 maximum		
3 minimum		

3. How many times per week do you travel for non-work purposes ?

Purpose	Trip

What is your usual mode of travel for work and non-work ?

	Work	Non-work		Work	Non-work
1 Walking			9 Microbus / jeep		
2 Bicycle			10 Minibus / bus		
3 Rickshaw			11 Staff bus		
4 Motor-cycle			12 School / college bus		
5 CNG / mishuk			13 Taxi		
6 Auto Tempo / leguna			14 Train		
7 Human Haular / maxi			15 Boat		
8 Car					

4. How much total fare (Tk) do you pay to travel from your resdience to the destination by your usual mode of of transport? (average/day)

	Work (Tk.)	Non-work (Tk.)
A typcial		
B maximum		
C minimum		

5. Do you use public transport bus as usual travel mode ? Yes ☐ No ☐

If yes, what are your reason(s) for using usual travel mode for travel to your place of work?
(Multiple answers, mark √ inside)

1 Cheaper (less expensive)		6 Comfort	
2 Reliable (more dependable)		7 No other transport	
3 Time saving (less travel time)		8 Parking Problem	
4 Convenience (less waiting time)		9 Other (describe)	
5 Safer (less chance of accident)			

6. What are the existing problems you face in your travel mode ?

		Work	Non-work
1	No bus service connection to my place		
2	Bus stop away from my residence		
3	Bus travel takes too much time		
4	Needs too many transfers		
5	Schedule not reliable		
6	Bus is uncomfortable		
7	Bus stops not convenient		
8	Bus is unsafe		
9	Fear of Danger		

7. If you are non user of Public Transport, will you shift to public transport if services are improvised ?

If yes, on what ground? Please Specify : Yes ☐ No ☐

Time saved	
Seat assured	
Reliable and comfortable	
Air-conditioned	
Express Service	

8. Suppose the existing Bus services are improvised, how much more fare would you be willing to pay ?

A As if travel time is reduced by:

	10 min	20 min	30 min
(I) Definitely will pay			
(II) Probably I may pay			
(III) I will not pay			

B If your travel is made more comfortable?

	Seat Given	Entry	Less Waiting	Air-condition
(I) Definitely will pay				
(II) Probably I may pay				
(III) I will not pay				

(Note : Under each willingness criteria, indicate amount coressponding to respective level.)

9. How do you consider traffic situation in Dhaka :

a)	Usual and normal delay	
b)	Congested and delays	
c)	Very congested and huge delays	
d)	Intolerable delays	
e)	Dead lock and fail to attend commitments	
f)	Any other (specify)	

10. What are your suggessions improving the situation :

a)	More road corridor and bypasses	
b)	Better traffic management	
c)	Arterials free from slow moving veh.	
d)	Construction of more flyovers	
e)	Automatic signaling and control	
f)	Others (specify)	

11. Which Transport System would you prefer to see in your city in next 20 years period ?

a)	A better transport system based on **ROAD** transport	
b)	A better transport system based on **RAILWAY** transport	

12. If you prefer to better **ROAD** transport, which is the most prioritized transport system?

a)	Bus Rapid Transit	
b)	Elevated Express Way	
c)	Parking problem sholved	
d)	Others (specify)	

13. If you prefer to better **RAILWAY** transport, which is the most prioritized transport system?

a)	Elevated Light Railway	
b)	Underground Light Railway	
c)	Others (specify)	

1.2.2 Sampling Size, Target Samples, Accomplishment and Expansion Rate

Based on the estimated population by zones the target samples are calculated. After carrying out the HIS survey, the samples collected and expansion rate are shown in Table 1.2-1.

Table 1.2-1.b Sample Size and Accomplishment

Jurisdiction	Ward/Area	Population	Household	Targeted Samples	Collected		Expansion Rate
					Sample	Rate [%]	
DCC	01/Uttra	106,252	21,818	218	218	1.00	100
DCC	02/Pallabi	198,455	44,199	442	416	0.94	106
DCC	03/Pallabi	108,588	22,529	225	225	1.00	100
DCC	04/Pallabi	82,405	17953	180	180	1.00	100
DCC	05/Pallabi	135,222	30,732	307	307	1.00	100
DCC	06/Pallabi	211,806	47,597	476	476	1.00	100
DCC	07/Mirpur	69,773	14,909	149	150	1.01	99
DCC	08/Mirpur	125,991	29,232	292	292	1.00	100
DCC	09/Mirpur	77,952	17,757	178	178	1.00	100
DCC	10/Mirpur	97,901	23,144	231	231	1.00	100
DCC	11/Mirpur	119,412	26,302	263	264	1.00	100
DCC	12/Mirpur	142,855	30,854	309	310	1.00	100
DCC	13/Mirpur	146,180	31,847	318	325	1.02	98
DCC	14/Kafrul	175,855	37,337	373	375	1.00	100
DCC	15/Cantonment	186,604	41,839	418	422	1.01	99
DCC	16/Kafrul	157,446	33,787	338	338	1.00	100
DCC	17/Badda	--	--	--	--	--	-
DCC	18/Badda	--	--	--	--	--	-
DCC	19/Gulshan	115,386	23,889	239	240	1.00	100
DCC	20/Gulshan	123,685	25,608	256	255	1.00	100
DCC	21/Badda	--	--	--	--	--	-
DCC	22/Khilgaon	134,055	28,401	284	285	1.00	100
DCC	23/Khilgaon	81,585	15,080	151	152	1.01	99
DCC	24/Khilgaon	95,077	18,790	188	191	1.02	98
DCC	25/Khilgaon	128,271	26,285	263	263	1.00	100
DCC	26/Khilgaon	--	--	--	--	--	-
DCC	27/Sabujbag	112,841	23,856	239	245	1.03	97
DCC	28/Sabujbag	69,773	14,536	145	146	1.00	100
DCC	29/Sabujbag	84,027	19,317	193	196	1.01	99
DCC	30/Sabujbag	54,218	11,585	116	116	1.00	100
DCC	31/Motijheel	49,363	10,480	105	105	1.00	100
DCC	32/Motijheel	63,119	10,698	107	107	1.00	100
DCC	33/Motijheel	47,746	8,858	89	90	1.02	98

Jurisdiction	Ward/Area	Population	Household	Targeted Samples	Collected		Expansion Rate
					Sample	Rate [%]	
DCC	34/Motijheel	99,197	21,061	211	216	1.03	98
DCC	35/Motijheel	83,559	17,018	170	170	1.00	100
DCC	36/Motijheel	75,537	12,444	124	125	1.00	100
DCC	37/Tejgaon	176,422	45,006	450	451	1.00	100
DCC	38/Tejgaon	115,100	26,893	269	269	1.00	100
DCC	39/Tejgaon	64,597	13,571	136	138	1.02	98
DCC	40/Tejgaon	112,824	20,664	207	211	1.02	98
DCC	41/Mohammadpur	136,946	32,920	329	329	1.00	100
DCC	42/Mohammadpur	90,135	19,016	190	190	1.00	100
DCC	43/Mohammadpur	121,083	26,039	260	260	1.00	100
DCC	44/Mohammadpur	65,068	13,874	139	142	1.02	98
DCC	45/Mohammadpur	72,671	13,660	137	137	1.00	100
DCC	46/Mohammadpur	98,642	20,172	202	202	1.00	100
DCC	47/Mohammadpur	104,316	23,708	237	237	1.00	100
DCC	48/Hazaribag	140,363	27,961	280	285	1.02	98
DCC	49/Dhanmondi	71,428	13,763	138	138	1.00	100
DCC	50/Tejgaon	104,299	19,279	193	194	1.01	99
DCC	51/Tejgaon	86,738	17,921	179	180	1.00	100
DCC	52/Dhanmondi	96,360	16,817	168	171	1.02	98
DCC	53/Ramna	71,051	13,559	136	136	1.00	100
DCC	54/Ramna	114,346	22,778	228	229	1.01	99
DCC	55/Ramna	99,274	19,314	193	193	1.00	100
DCC	56/Ramna	64,188	7,837	78	82	1.05	96
DCC	57/Ramna	55,990	7,338	73	73	0.99	101
DCC	58/Hazaribag	109,526	22,261	223	223	1.00	100
DCC	59/Lalbag	75,400	14,669	147	146	1.00	100
DCC	60/lalbag	98,975	22,242	222	222	1.00	100
DCC	61/Lalbag	44,067	8,557	86	86	1.01	100
DCC	62/Lalbag	76,610	13,516	135	136	1.01	99
DCC	63/Lalbag	40,680	7,187	72	72	1.00	100
DCC	64/Lalbag	40,338	6,849	68	66	0.96	104
DCC	65/lalbag	92,160	19,361	194	195	1.01	99
DCC	66/Lalbag	52,454	10.974	110	110	1.00	0
DCC	67/Lalbag	54,167	6,754	68	71	1.05	95
DCC	68/Kotwali	60,511	11,959	120	142	1.19	84
DCC	69/Kotwali	96,298	18,067	181	181	1.00	100
DCC	70/Kotwali	73,935	13,743	137	138	1.00	100
DCC	71/Kotwali	44,178	9,688	97	97	1.00	100
DCC	72/Kotwali	44,479	8,392	84	84	1.00	100

Jurisdiction	Ward/Area	Population	Household	Targeted Samples	Collected		Expansion Rate
					Sample	Rate [%]	
DCC	73/Kotwali	36,826	8,238	82	82	1.00	100
DCC	74/Sutrapur	76,286	13,574	136	138	1.02	98
DCC	75/Sutrapur	52,883	10,705	107	108	1.01	99
DCC	76/Sutrapur	64,489	12,695	127	128	1.01	99
DCC	77/Sutrapur	59,920	10,796	108	108	1.00	100
DCC	78/Sutrapur	43,084	8,038	80	87	1.08	92
DCC	79/Sutrapur	65,669	12,229	122	125	1.02	98
DCC	80/Sutrapur	43,741	9,151	92	95	1.04	96
DCC	81/Sutrapur	77,303	17,333	173	174	1.00	100
DCC	82/Sutrapur	63,663	12,733	127	144	1.13	88
DCC	83/Shyampur	69,624	30,671	307	308	1.00	100
DCC	84/Demra	62,705	12,012	120	120	1.00	100
DCC	85/Demra	69,675	15,313	153	153	1.00	100
DCC	86/Demra	79,637	16,386	164	167	1.02	98
DCC	87/Shyampur	78,802	16,802	168	168	1.00	100
DCC	88/Shyampur	50,030	11,744	117	119	1.01	99
DCC	89/Shyampur	78,130	17,518	175	175	1.00	100
DCC	90/Shyampur	78,370	17,611	176	177	1.01	99
Other DMA	Uttar Khan/Uttara	52,014	10,949	100	100	0.91	109
Other DMA	Dakshinkhan/Uttara	170,760	41,730	100	100	0.24	417
Other DMA	Bashundhora R/A/Badda	--	--	100	101	--	--
Other DMA	Adarsha Nagar/ Badda	--	--	100	100	--	--
Other DMA	Banashree R/A/Khilgaon	--	--	100	100	--	--
Other DMA	Simrail and Khorda Goshpara	--	--	100	100	--	--
Other DMA	Fatulla	--	--	100	106	--	--
Other DMA	Sultanganj/Kamrangirchar	--	--	100	100	--	--
Outer DMA	Hasnabad/Keraniganj	--	--	100	100	--	--
Outer DMA	Zinjira/Keraniganj	--	--	100	100	--	--
Outer DMA	Washpur	--	--	100	101	--	--
Outer DMA	Aminbazar/Savar	--	--	100	100	--	--
Outer DMA	Birulia/Savar	--	--	100	100	--	--
Outer DMA	Ashulia/Savar	--	--	100	100	--	--
Narayanganj	Municipality	241,393	50,638	104	106	0.21	487
Savar	Municipality	127,540	30,386	100	100	0.33	304
Tongi	Municipality	282,815	67,587	100	102	0.15	676

Source; JICA Study Team

1.2.3 Results and Analysis

In this section, the survey results are analyzed from six standpoints: (1) Socio-economic Profile, (2) Trip Production, (3) Trip Purpose, (4) Transport Mode, (5) Trip Generation and Attraction, (6) Origin and Destination Matters.

(1) Socio-economic Profile

a) Demographic Features

Population as of the year 2009 was estimated based on population census which was conducted in the year 2001. Table 1.2-2 shows the population aging 5 years old and above accounts for 7.58 million.

Table 1.2-2 Population by Gender and by Age Group

Age Group	Male		Female		Total	
	No.	%	No.	%	No.	%
5- 9	297,835	6.9%	259,436	7.9%	557,271	7.3%
10- 14	381,976	8.9%	346,619	10.6%	728,595	9.6%
15- 19	368,169	8.5%	339,736	10.4%	707,905	9.3%
20- 24	444,166	10.3%	428,060	13.1%	872,226	11.5%
25- 29	474,693	11.0%	480,901	14.7%	955,594	12.6%
30- 34	449,417	10.4%	359,856	11.0%	809,274	10.7%
35- 39	468,464	10.9%	334,517	10.2%	802,981	10.6%
40- 44	373,779	8.7%	243,839	7.4%	617,618	8.1%
45- 49	326,806	7.6%	198,099	6.0%	524,905	6.9%
50- 54	269,655	6.3%	139,701	4.3%	409,356	5.4%
55- 59	189,062	4.4%	76,669	2.3%	265,731	3.5%
60- 64	138,825	3.2%	39,337	1.2%	178,162	2.3%
65- 69	67,909	1.6%	17,489	0.5%	85,398	1.1%
70- 74	40,689	0.9%	8,287	0.3%	48,977	0.6%
75- 79	13,334	0.3%	2,599	0.1%	15,934	0.2%
80+	2,609	0.1%	955	0.0%	3,564	0.0%
Total	4,307,389	100.0%	3,276,100	100.0%	7,583,490	100.0%

b) Household Building Type

Housing building type, which is strongly related to household income level and land use, is classified in Table 1.2-3. The housing building type was dominated by permanent house, followed by apartment and semi-permanent house.

Figure 1.2-1 shows household building type by income. It is obvious that households with higher income tend to live in ‘permanent house’ or ‘apartment/flat’, which is accounted for 50 and 46%, respectively. While, the share of ‘semi-permanent house’ increases as income reduces.

Table 1.2-3 Housing Building Type

	Housing Building Type	% Share
1	Permanent	42.5%
2	Semi-permanent	20.8%
3	Thatch House	1.4%
4	Shop/Hotel/Hostel	0.3%
5	Apartment/Flat	31.9%
6	Hotel	0.0%
7	Non-permanent	1.2%
8	Slum	1.7%
9	Others	0.2%
	Total	100.0%

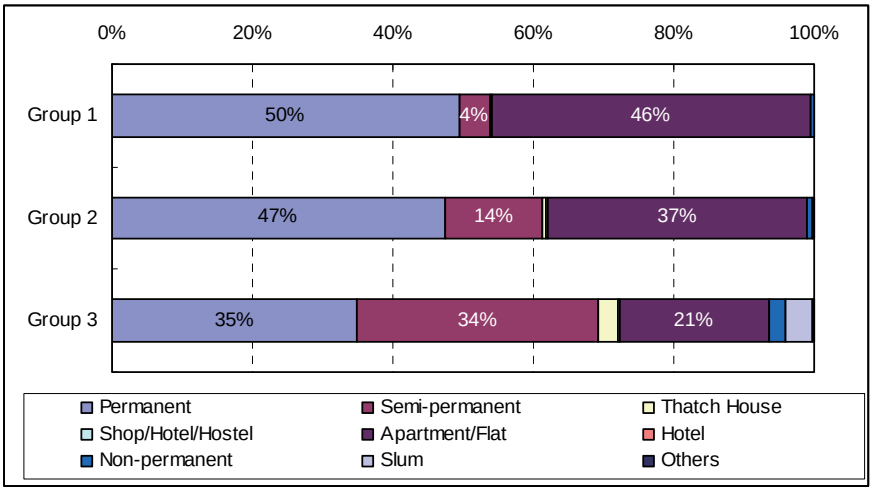


Figure 1.2-1 Housing Building Type by Income Group

c) Household Income

Households who have high income (Group 1) tend to concentrate in Uttara, Baridhara, and Dhanmondi Areas.

Table 1.2-4 Average Household Income by Income Group

Area	Group	Average HH Income
DCC	Group 1	BDT 83,715
	Group 2	BDT 29,340
	Group 3	BDT 12,006
	Total	BDT 33,691
Outside DCC	Group 1	BDT 87,907
	Group 2	BDT 28,834
	Group 3	BDT 11,868
	Total	BDT 31,549
Grand Total		BDT 33,563

Note: 'Outside DCC' means DMA area excluding DCC.

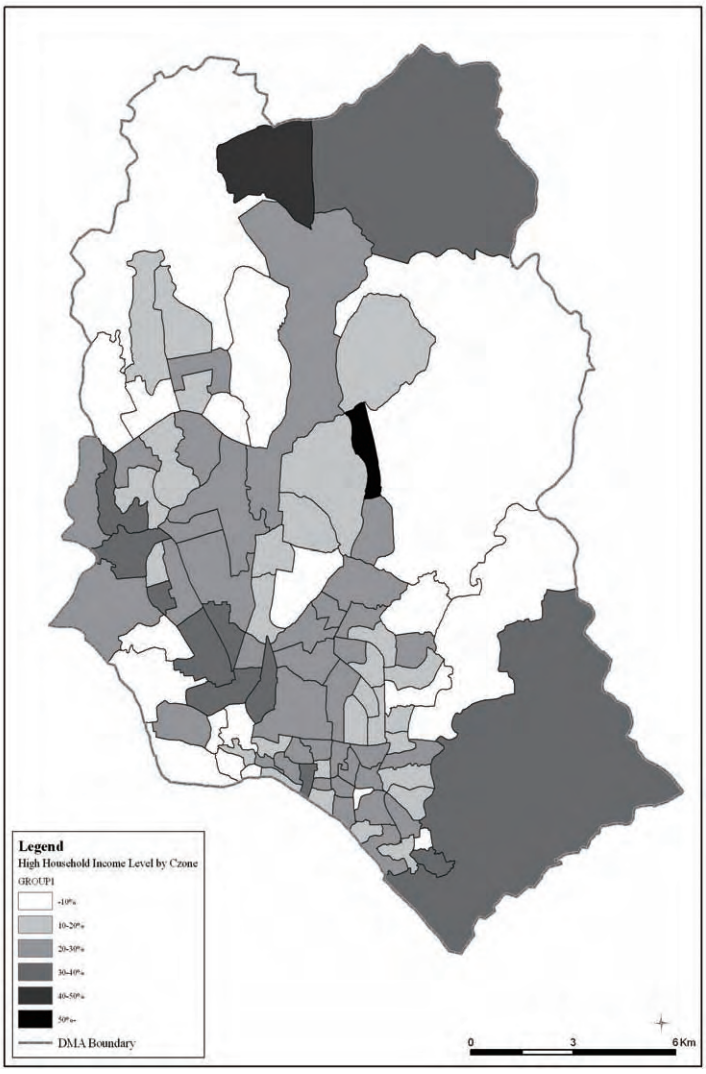


Figure 1.2-2 Spatial Distribution of the Share of High Household Income Level (Group 1)

(2) Trip Production

a) Trip Production Rate

Trip production rate is one of important indicators to understand travel behavior and it is used for estimating trip production in future. Trip production rate of the study area is 2.74. Judging from the trip rate by region, DCC and outskirt of DCC has produced almost same trip.

Table 1.2-5 Trip Production Rate

Region	Trip Production Rate
DCC	2.74
DMA (excl. DCC)	2.73
Total	2.74

Unit: trips/person/day

Figure 1.2-3 shows spatial distribution of trip production rates over DMA. Higher trip rates are found particularly in the southern part of DMA.

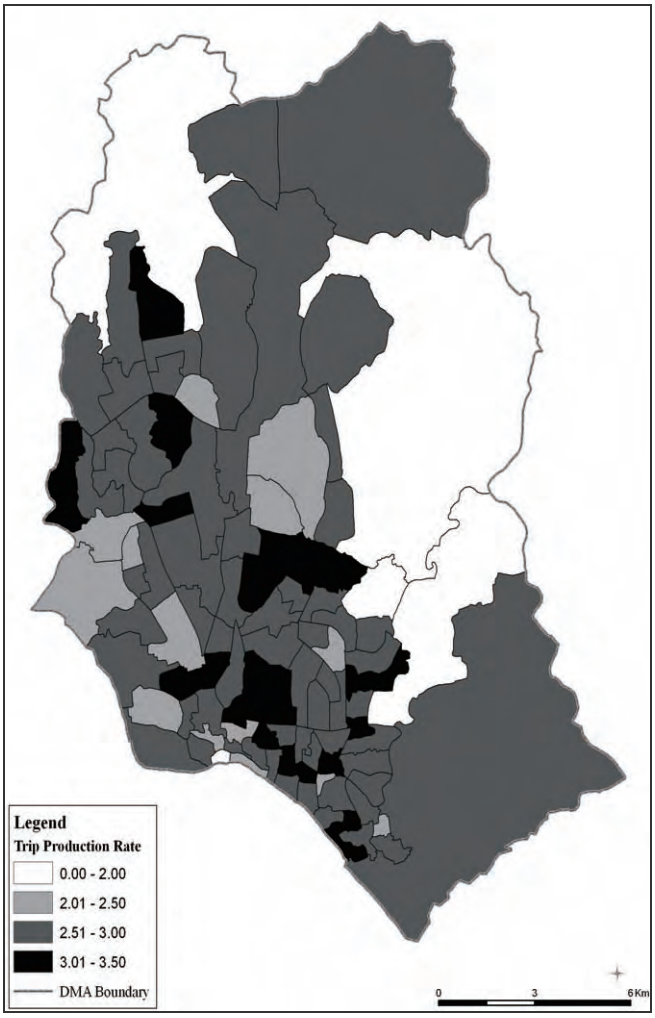


Figure 1.2-3 Spatial Distribution of Trip Production Rate by Zone

b) Trip Production Rate by Gender and by Age Group

Figure 1.2-4 shows that the trip production rate by males is higher than that of females. It is interesting that high trip rates are found in age group of 30-49 years for males and 25-39 years for females.

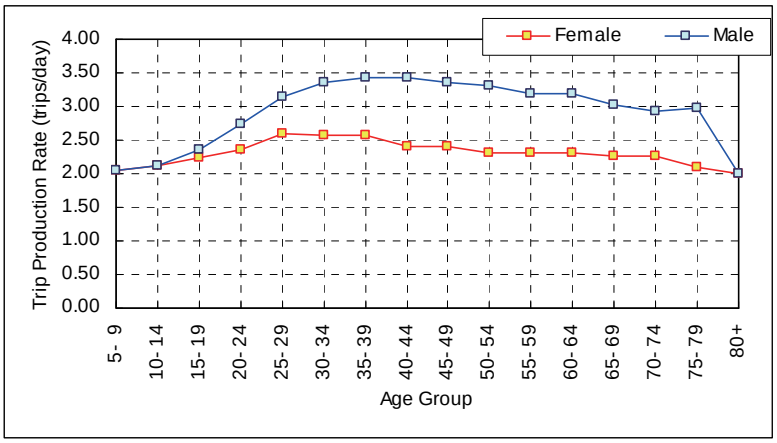


Figure 1.2-4 Trip Production Rate by Gender and by Age

c) Trip Production Rate by Trip Purpose

Trip production rate by trip purpose is shown in Figure 1.2-5. The highest rate was found 'To Home' purpose, followed by 'Private', 'Home to Work' and 'Home to School' and 'NHBB'.

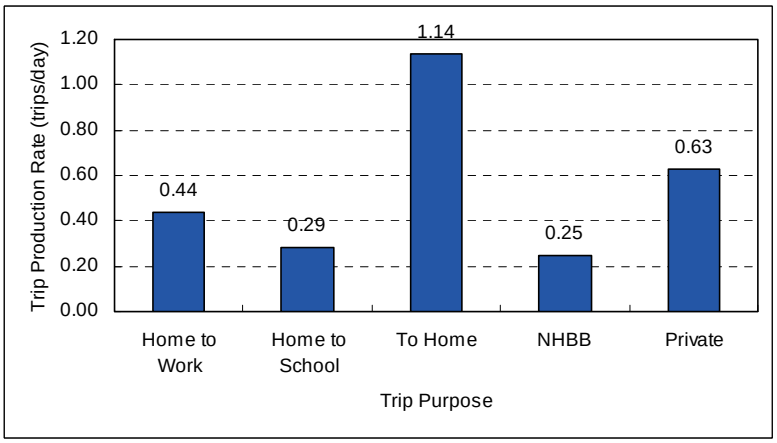


Figure 1.2-5 Trip Production Rate by Trip Purpose

d) Trip Production Rate by Trip Purpose and by Gender

Males have a higher rate for 'Home to Work', 'To Home' and 'NHBB' purposes, while females have a higher rate for 'Home to School' and 'Private' purposes.

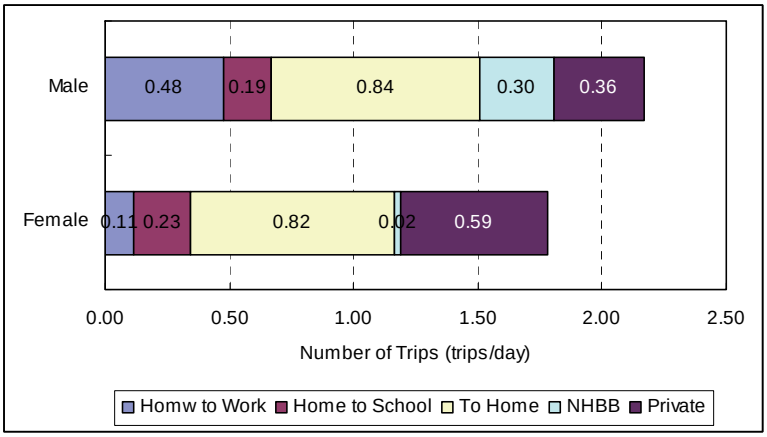


Figure 1.2-6 Trip Production Rate by Gender and by Trip Purpose

e) Trip Production Rate by Trip Purpose and by Age Group

Table 1.2-6 and Figure 1.2-7 show trip production rate by age group and trip purpose. Age group less than 25 years old has a higher rate for 'Home to School' purpose, while age group of 25-59 years has a higher rate for 'Home to Work' purpose.

Table 1.2-6 Trip Production Rate by Age Group and by Trip Purpose

Age Group	Home to Work	Home to School	To Home	NHBB	Private	Total
5- 9	0.00	0.98	1.03	0.00	0.06	2.08
10- 14	0.02	0.96	1.05	0.01	0.09	2.13
15- 19	0.17	0.70	1.10	0.04	0.31	2.33
20- 24	0.32	0.38	1.13	0.13	0.61	2.57
25- 29	0.53	0.08	1.16	0.27	0.82	2.85
30- 34	0.63	0.01	1.16	0.41	0.86	3.07
35- 39	0.65	0.01	1.19	0.42	0.87	3.13
40- 44	0.67	0.00	1.18	0.41	0.80	3.06
45- 49	0.67	0.00	1.16	0.41	0.78	3.02
50- 54	0.68	0.00	1.18	0.38	0.76	3.00
55- 59	0.66	0.00	1.18	0.34	0.80	2.99
60- 64	0.55	0.00	1.19	0.33	0.86	2.93
65- 69	0.52	0.00	1.19	0.29	0.90	2.90
70- 74	0.48	0.00	1.22	0.20	0.95	2.85
75- 79	0.28	0.00	1.23	0.00	1.20	2.71
80+	0.00	0.00	0.99	0.00	1.01	2.00
Total	0.44	0.29	1.14	0.25	0.63	2.74

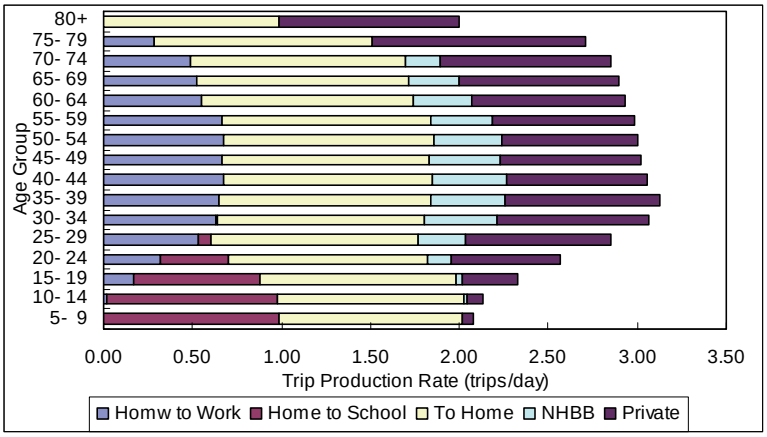


Figure 1.2-7 Trip Production Rate by Age Group and by Trip Purpose

(3) Trip Purpose

a) Trip Purpose by Region

Figure 1.2-8 presents trip purpose comparison between DCC and DMA excluding DCC. The portion of 'NHBB' and 'To Home' trips in DCC is higher than in outskirt DCC, while the share of 'Home to Work' and 'Private' trips is high in outside DCC.

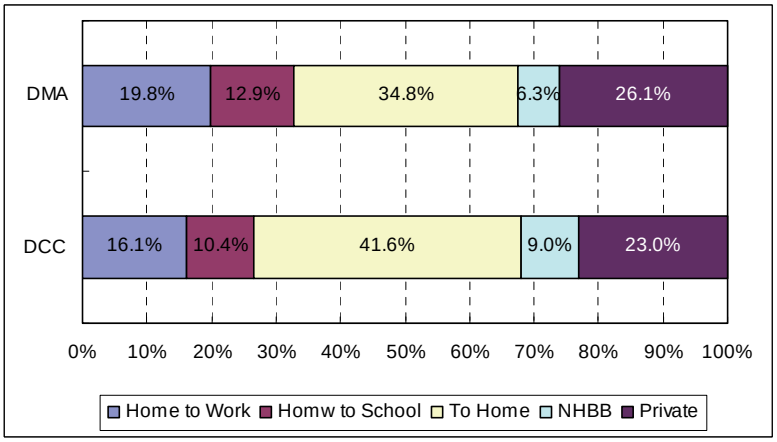


Figure 1.2-8 Trip Purpose Comparison between DCC and outskirt DCC

b) Trip Purpose by Gender

For males, 'Home to Work' trip purpose is high. On the other hand, the share of 'Private' trips is high for females. This large difference may be due to cultural back-ground.

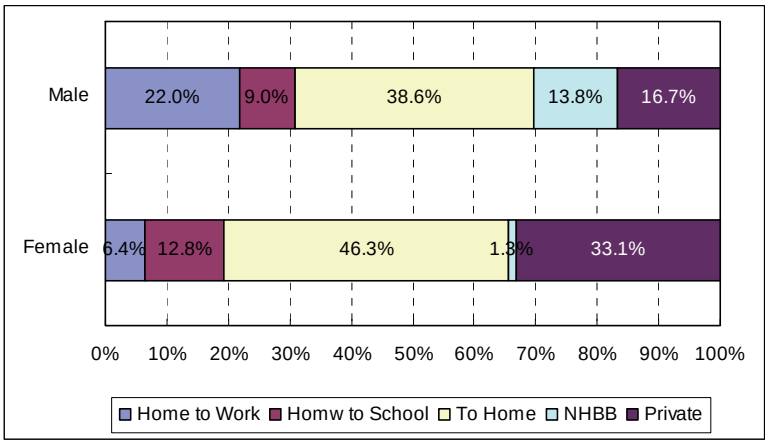


Figure 1.2-9 Trip Purpose Composition by Gender

c) Trip Purpose by Age Group

As for an age group of less than 25 years, most of trips are dominated by 'Home to School' purpose. The share of 'Private' trips increases as age increased.

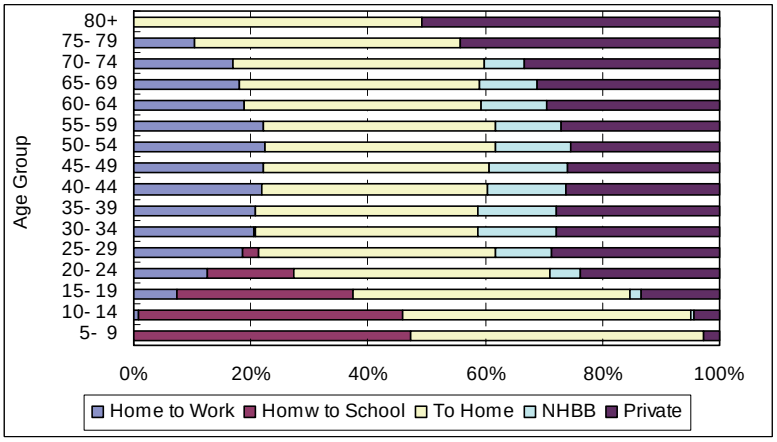


Figure 1.2-10 Trip Purpose Composition by Age Group

(4) Transport Mode

a) Modal Share by Region

Figure 1.2-11 shows modal shares in DCC and DMA excluding DCC. DMA has slightly higher modal share of non-motorized transport including walking and rickshaw. Meanwhile, the modal share of bus transport in DMA is lower than in DCC.

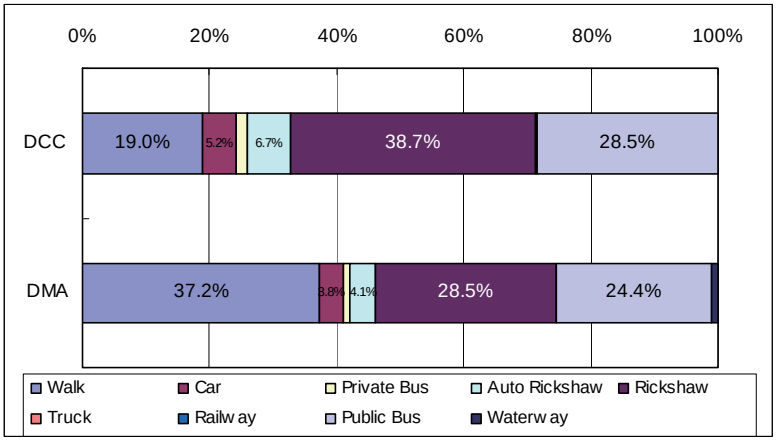


Figure 1.2-11 Modal Share in DCC and DMA (excluding DCC)

b) Spatial Distribution of Modal Share over DMA

Relatively high usage of private transport (passenger car) is concentrated in the northern part of DMA, especially around Uttara, Baridhara and Gulshan Areas (see Figure 1.2 12). These HIS zones are resided by residents of high-income level (Group 1).

On the other hand, the usage of public bus transport is quite impressive in the study area. Public bus transport plays an important role in the areas along Mirpur Road.

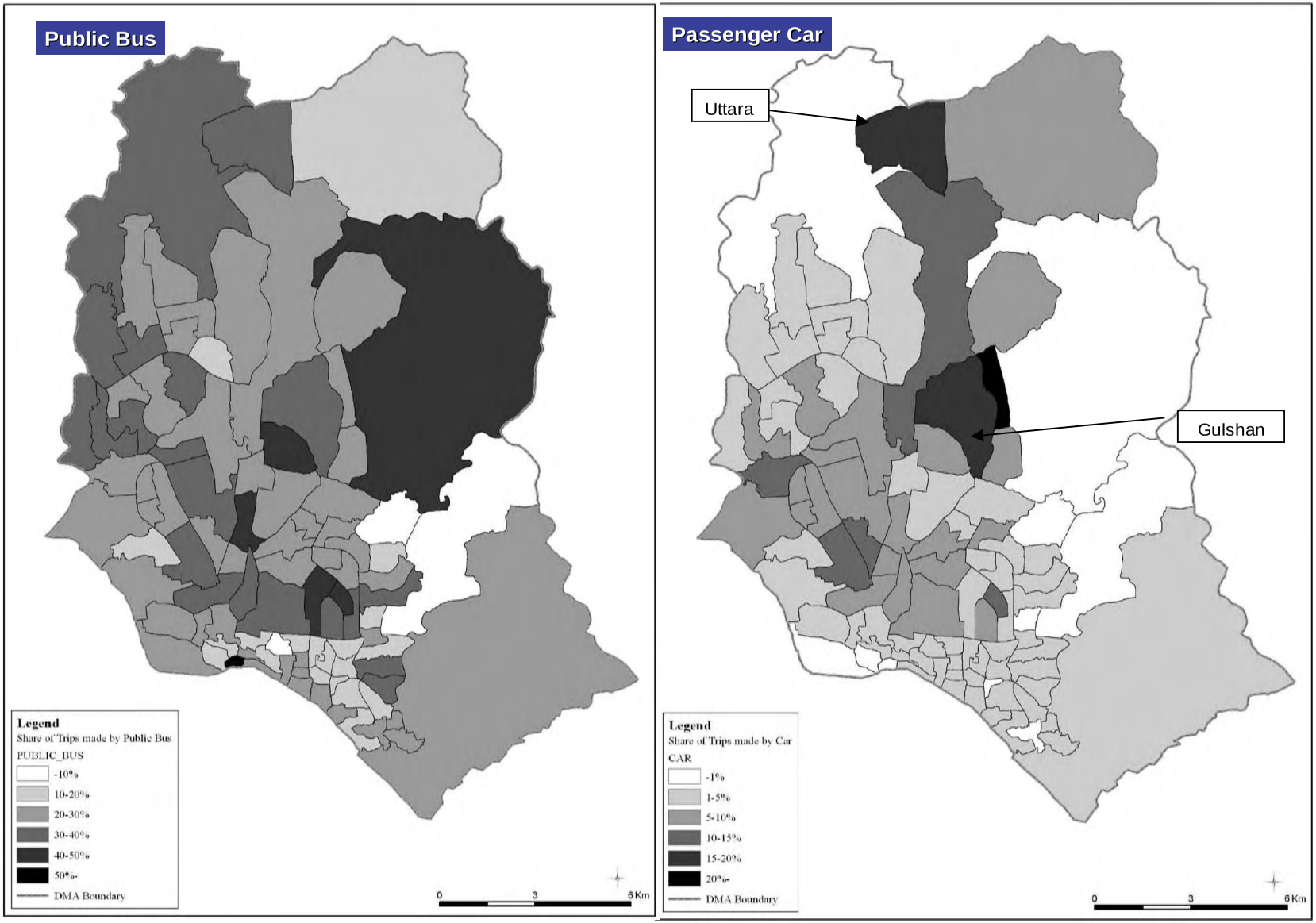


Figure 1.2-12 Spatial Distribution of the Share of Trips made by Passenger Car and Public Bus

c) Modal Share by Gender

The modal share shows similar condition excluding rickshaw and public bus. Females largely depend on rickshaw while, males relies more on bus.

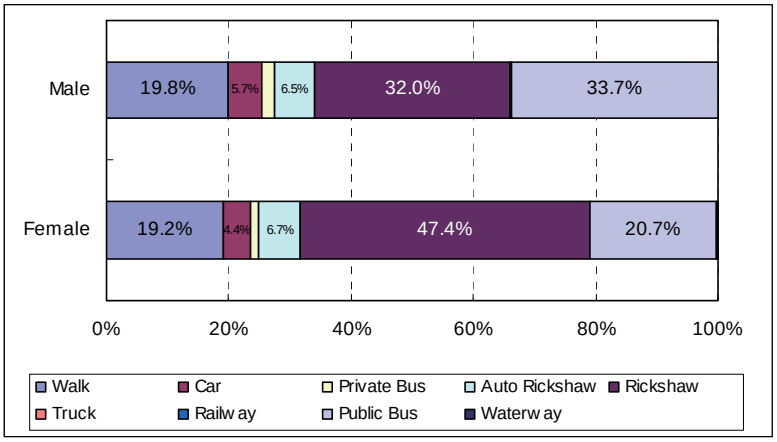


Figure 1.2-13 Modal Share by Gender

d) Modal Share by Age Group

Age group of less than 15 years, most of which are thought to be students of primary and secondary school, is characterized by walking trips. The usage of bus dramatically increases from age group of above 15 years. As for age group of above 20 years, the usage of private car and auto rickshaw goes up and that of walking declines as they grow old. Moreover, all age groups largely depend on rickshaw.

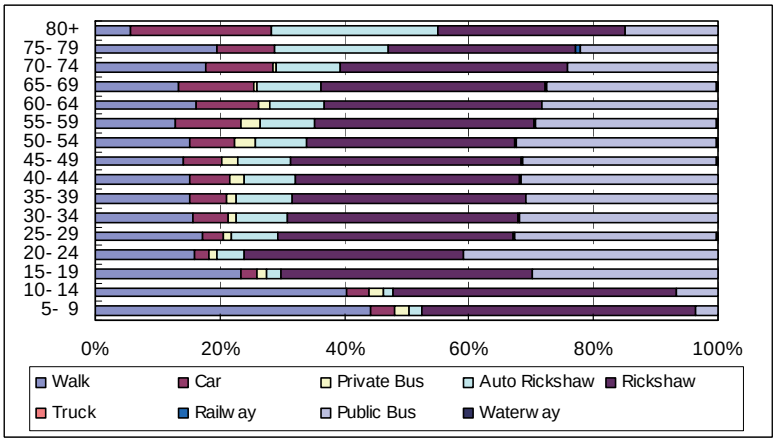


Figure 1.2-14 Modal Share by Age Group

e) Modal Share by Household Income Group

Modal share varies strongly depending on monthly household income level. Group 1 resident, who earns more than BDT. 50,000 per month use private cars and its modal share accounts for 17.5%.

Meanwhile, the person who belongs to Group 3 and the monthly household income is less than BDT. 20,000 heavily relied on three transport modes such as walking, auto rickshaw and public bus. The middle income group in BDT. 20,000-49,999, the modal share of Group 2 is dominated by auto rickshaw and public bus.

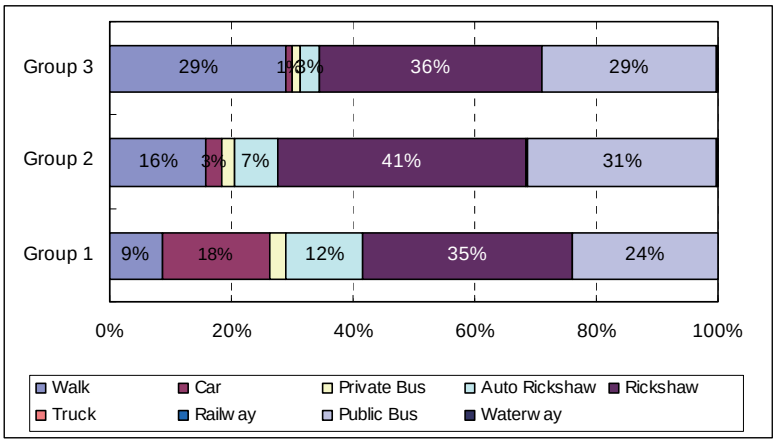


Figure 1.2-15 Modal Share by Household Income Group

f) Modal Share by Purpose

Modal share varies according to trip purpose. Most of the trips for 'Home to School' purpose are loaded by non-motorized transport, walking and rickshaw. Trips for 'NHBB' purpose is dominated by public bus with the share of 47%.

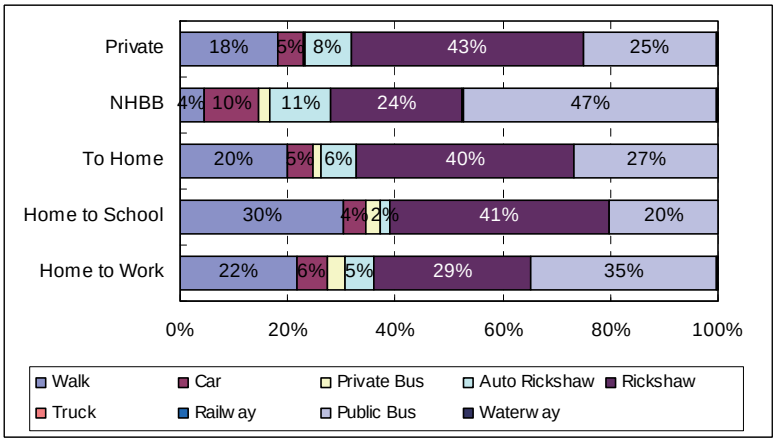


Figure 1.2-16 Modal Share by Trip Purpose

(5) Trip Generated and Attracted

a) Trip Generated and Attracted by Transport Mode

Trips generated and attracted by transport mode are presented in Figure 1.2-17. The following features can be pointed out.

i. A number of trips by passenger car were mostly seen in the central part of DCC and Gulshan area, but trips by rickshaw as one of the ultimate level of transit were equally distributed over DMA.

ii. Regarding bus transport, higher trips by public bus are found in Gulshan, Tejgaon, Dhanmondi and New Market Areas. Higher trips by auto-rickshaw were seen over the DCC.

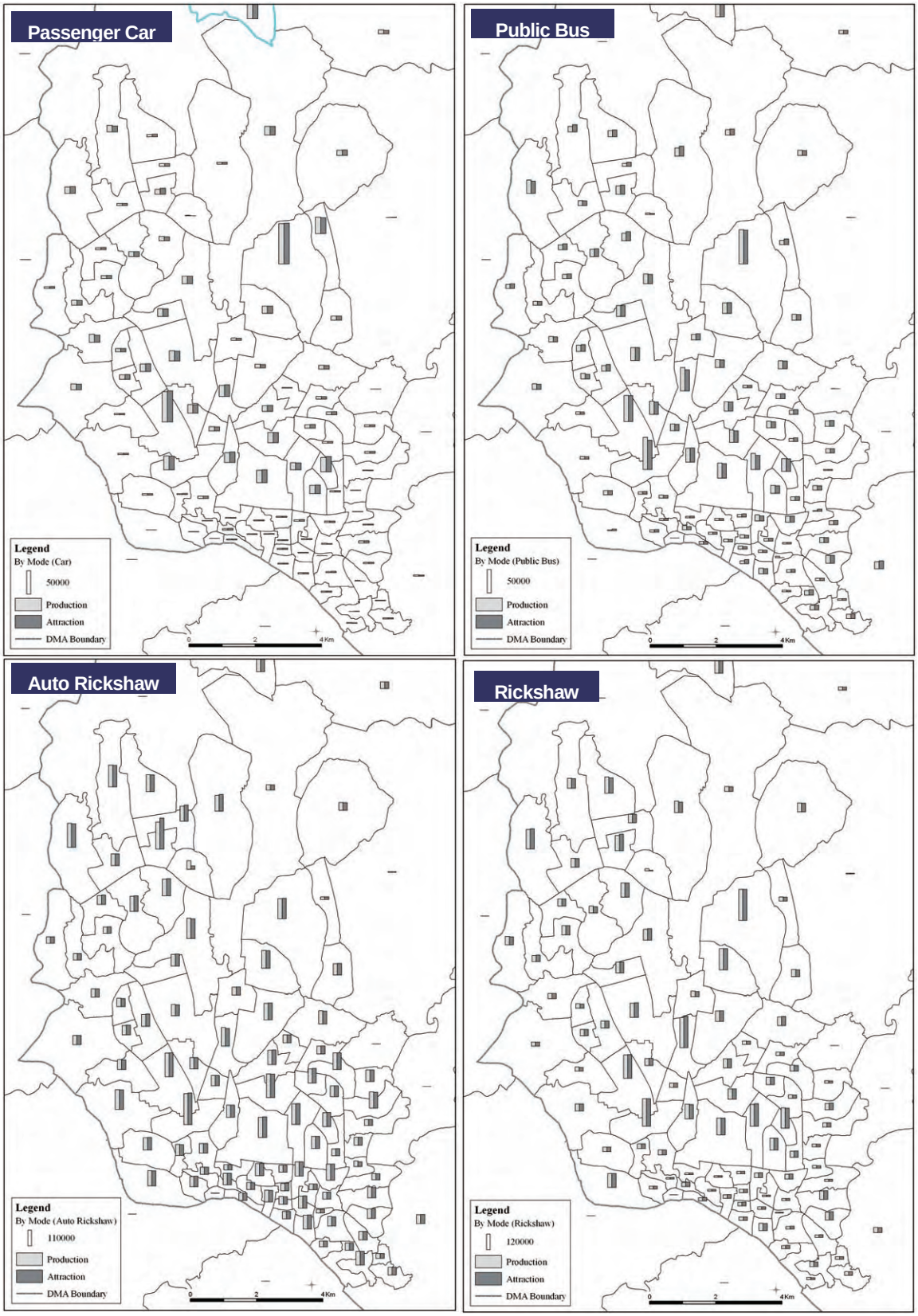


Figure 1.2-17 Trip Generation and Attraction by Transport Mode by Zone

(6) Origin and Destination Matter

a) OD Flow by Trip Purpose

OD flow by trip purpose is illustrated in Figure 1.2-8 and Figure 1.2-9. Major features can be summarized as follows:

i. Business related trips such as 'Home to Work' and 'Non-Home Based Business' purposes were pointed out 'Paltan Area' as the business center in Dhaka.

ii. There could not see a large number of trips by 'Home to School' because about 50% of school trips were made in the same zone, that is, an intra-zone trip.

iii. 'Private' trips were seen everywhere in DCC; however, it has lively movement especially in the southern part of DCC.

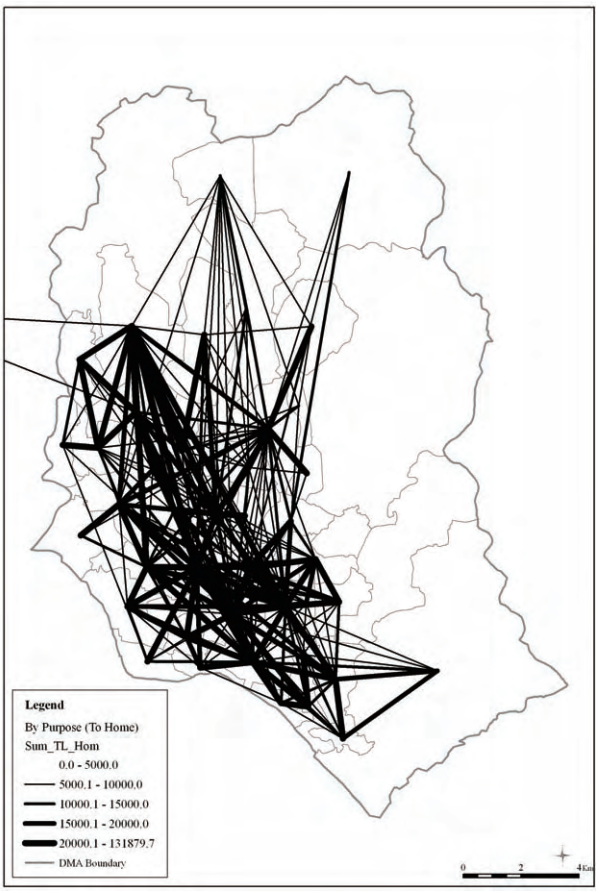


Figure 1.2-18 Desire Line by Trip Purpose

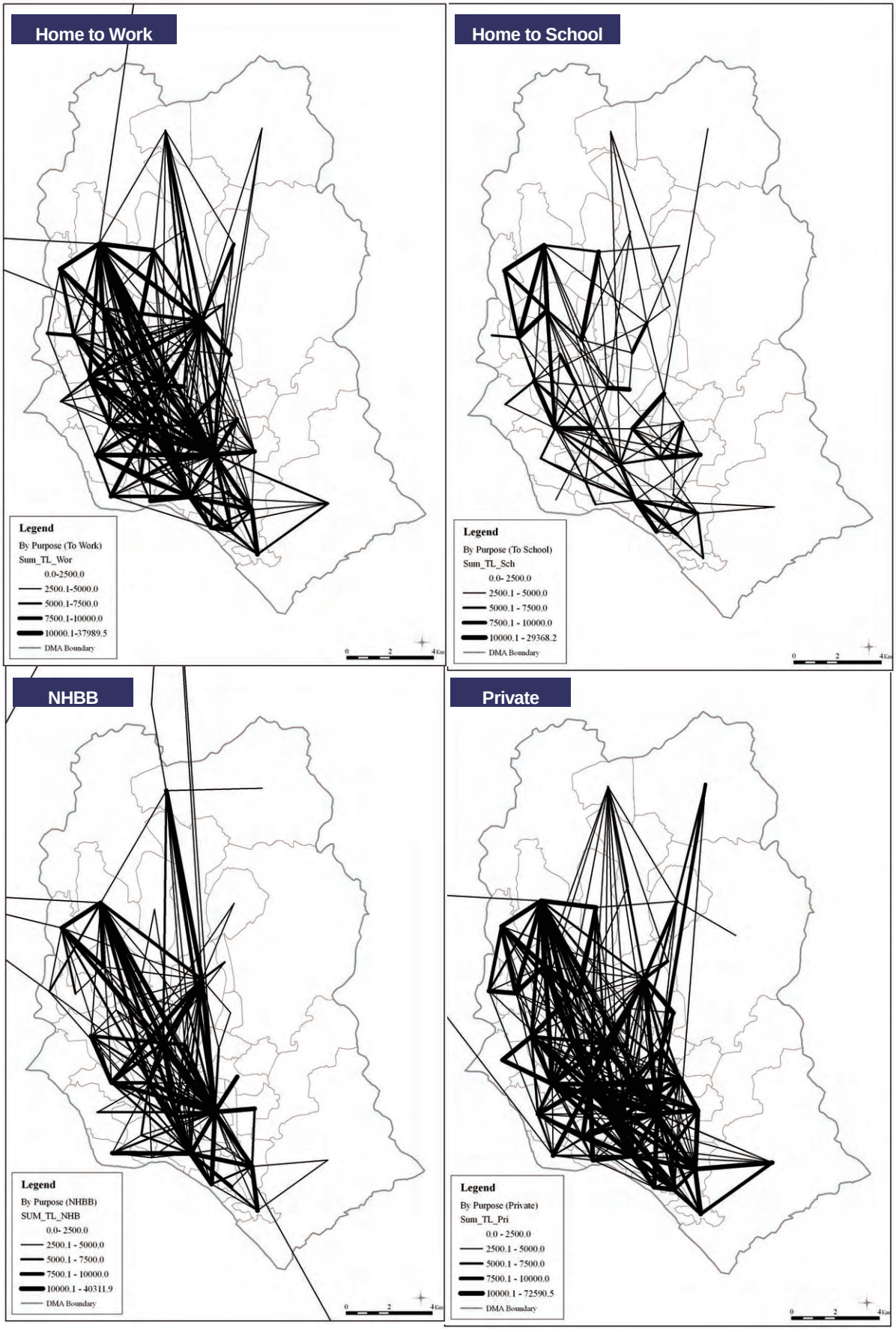


Figure 1.2-19 Desire Line by Trip Purpose

b) Travel Distance by Trip Purpose

Usually, population movement toward suburban area and increase of private mode ownership car bring longer trips, which has greatly impacted transport infrastructure and caused serious traffic congestion. Average travel distance by all residents in DMA who made trip(s) was estimated at 3.50 km for a case of including intra-zone trips (trips within a zone) and 4.95 km for a case of excluding intra-zone trips. Trips with 'NHBB' purpose has comparatively longer travel distance (Figure 1.2-20).

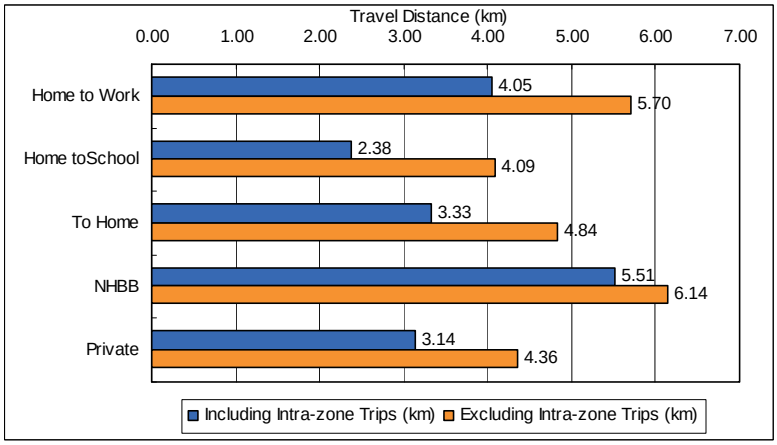


Figure 1.2-20 Trip Distance by Trip Purpose

c) Travel Distance by Transport Mode

The following figure shows travel distance by transport mode in terms of intra-zone trips (hereafter, average travel distance including intra-zone trips are made used of). 'Railway' and 'Truck' have relatively long travel distance of more than 12 km and they are being used as line-haul transport mode across Bangladesh. Meanwhile, transport modes characterized as private or bus transport modes have medium travel distance, ranging from 5 to 8 km. NMT such as walking and rickshaw has short travel distance and they are frequently made for use of as feeder system.

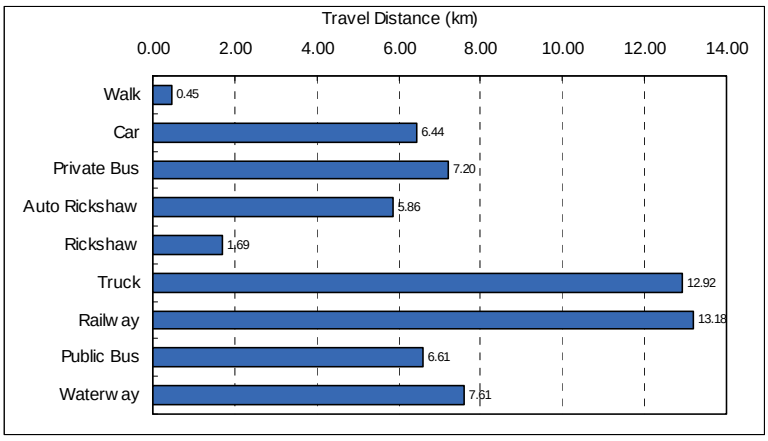


Figure 1.2-21 Travel Distance by Travel Mode

d) Travel Distance by Gender

Compared to females, males make long trips as shown in Figure 1.2-22.

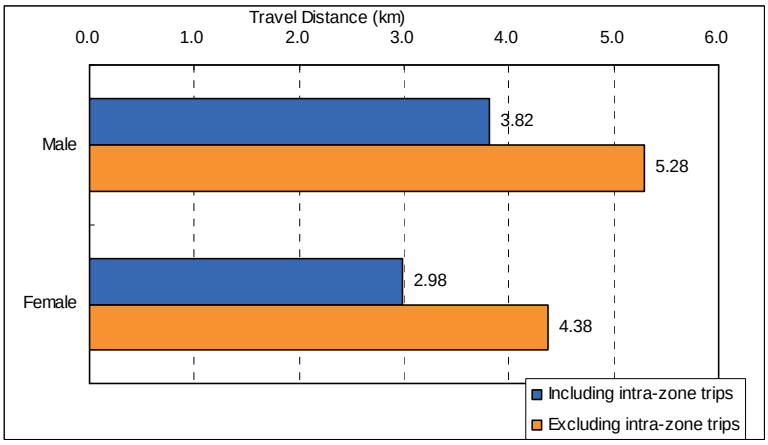


Figure 1.2-22 Travel Distance by Gender

e) Travel Distance by Age Group

Among the 5 to 19 years old group took shorter trips. It is because most of those who belong to the above group are students. Travel distance of those aged 20 to 69 is almost the same, ranging from 3.6 to 4.2 km.

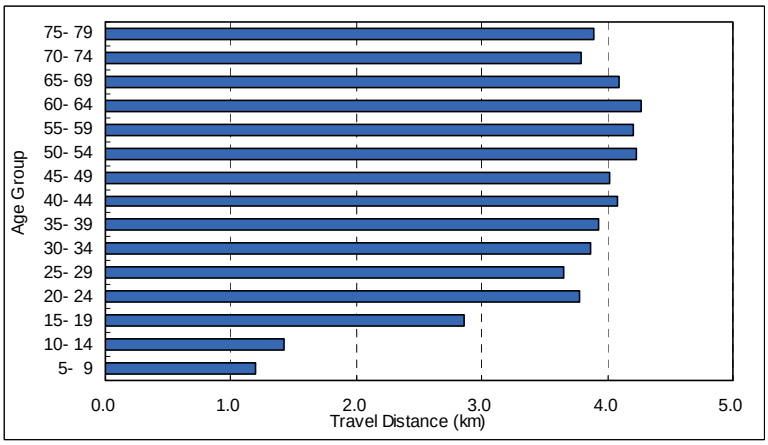


Figure 1.2-23 Travel Distance by Age Group

f) Travel Distance by Household Income

As household income increases, travel distance becomes longer accordingly. Excluding intra-zone trips, travel distance for all groups is longer than the distance in consideration of including intra-zone trips.

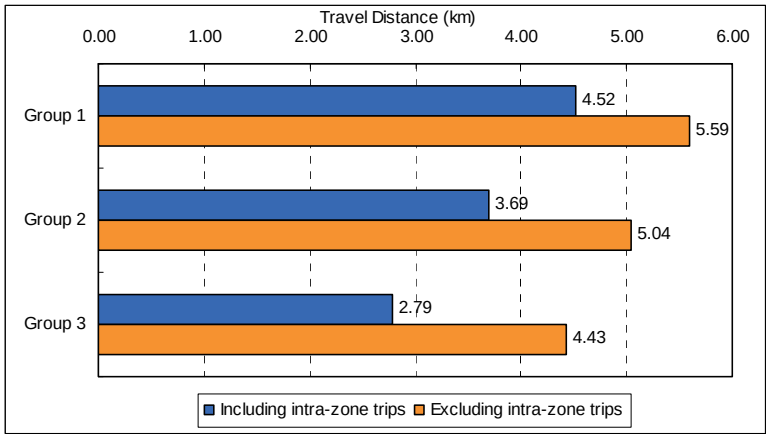


Figure 1.2-24 Travel Distance by Income Group

1.3 Cordon and Screen Line Survey

1.3.1 Survey Method

(1) Survey Locations

a) Cordon Line Survey

The locations of the surveys are set on all arterial roads crossing the study area boundary. This is referred to as the external cordon. The traffic count, interview and occupancy counting surveys were carried out at the same locations and at the same time for each single location.

Table 1.3-1 Name of External Cordon Line and Traffic Count Station

No.	Name of Cordon Line	Survey Hours	Traffic Count Locations
CL-1	Dhaka-Comilla Road	24h	Kanchpur Bridge
CL-2	Dhaka-Gazipur-Mymensingh Road	24h	IUT, Gazipur
CL-3	Dhaka-Manikganj Road	24h	Aminbazar
CL-4	Dhaka-Mawa Road	24h	Hasnabad
CL-5	Tongi-Ghorasal Road	16h	Near Rail Crossing
CL-6	Tongi-Ashulia Road	16h	Near Toll Plaza
CL-7	Mirpur-Ashulia Road	16h	Easter (Diabari) Housing Police Box
CL-8	2nd Buriganga Bridge-Dohar Road	16h	Jinjira
CL-9	Dhaka-Munshiganj Road	16h	Mukterpur Bridge
CL-10	Narayanganj-Kadamrasul Road	16h	Bandar Kheya Ghat
CL-11	Dhaka Bypass Road	16h	Kanchan Bridge
CL-12	Jatrabari-Demra Road	16h	Tarabo Bridge
CL-13	Dhaka-2nd Buriganga Bridge	16h	2nd Buriganga Bridge

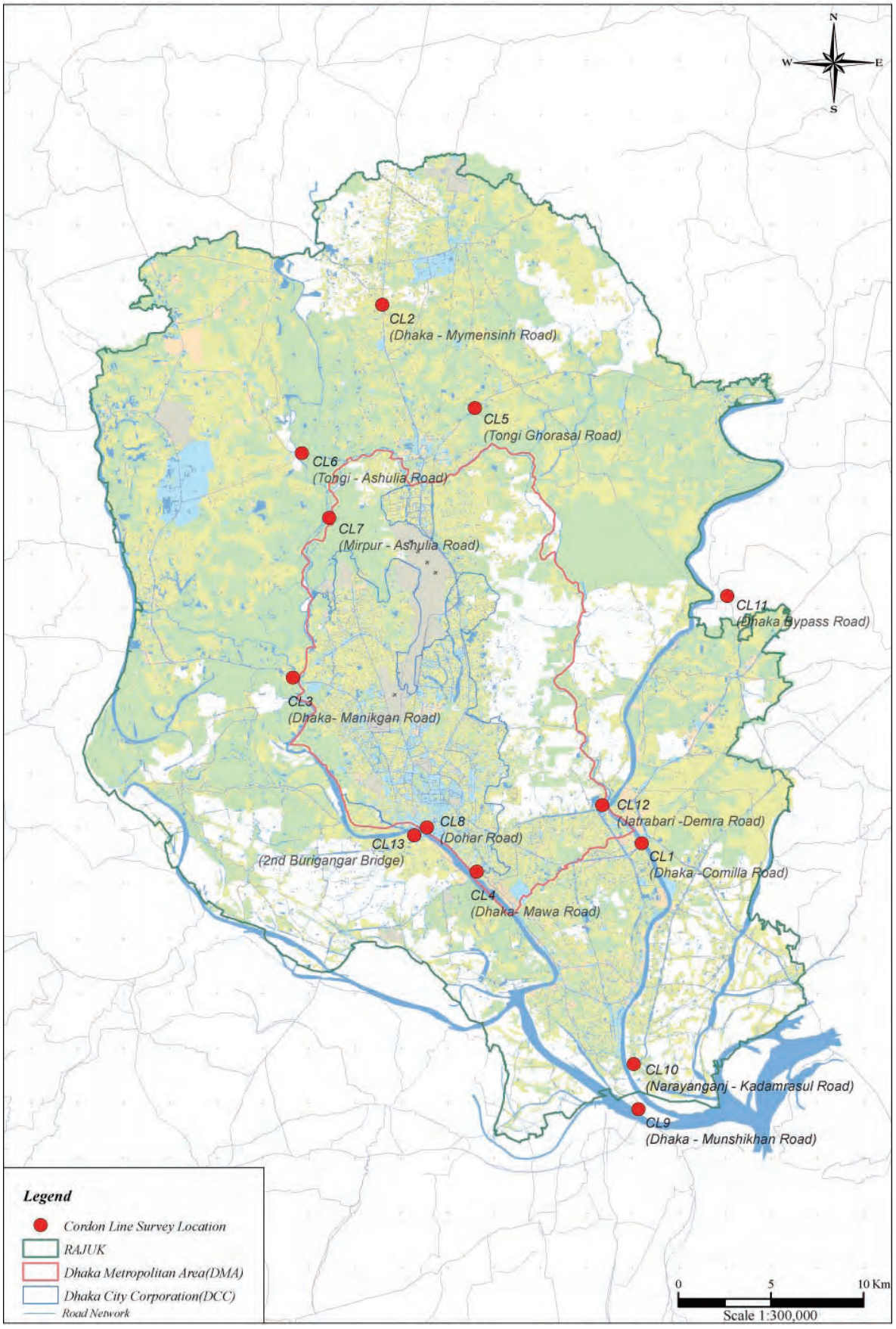


Figure 1.3-1 Survey Locations of Cordon Line Survey

b) Screen Line Survey

The screen line survey includes 51 locations on the arterial, primary and secondary roads, as described in Table 1.3-2 and illustrated in Figure 1.3-2.

Table 1.3-2 Name of North-South Screen Line and Traffic Count Station

SL	Name of North-South Screen Line	Survey Hours	Traffic Count Station
SP-1	New Airport Road	24h	Shaheen College
SP-2	New Eskaton Road	24h	East of Bangla Motor
SP-3	Hare Road	24h	Jamuna Guest House
SP-4	Bhashani Road (Shahabag-Shegunbagicha)	24h	Near Shishu Park
SP-5	Dhaka-Srinagar Road	24h	Nawab Yusuf Market
SP-6	Tongi-Ashulia	16h	West Abdullahpur
SP-7	Mirpur Road	24h	Asadgate
SP-8	Kazi Nazrul Islam Avenue	24h	Karwan Bazar
SP-9	Tongi Diversion Road	24h	Tejgaon Polytechnic
SP-10	DIT Road (Malibagh-Rampura)	24h	Malibag Rail Crossing
SP-11	North-South Road	24h	Hotel Al Razzak
SP-12	Atish Dipankar Road	24h	Golapbag
SP-13	Dhaka-Mymensingh Road	16h	Kawla
SP-14	Progati Sharani	16h	Joar Shahara
SP-15	New Airport Road	16h	Banani Rail Crossing
SP-16	Mirpur14-Mirpur 10	16h	Govt. Staff Quarter
SP-17	Begum Rokeya Sharani	16h	Shewrapara
SP-18	Mirpur Road (Shyamoli- Technical)	16h	Kallyanpur BRTC Bus Depot
SS-1	Sonargaon Janapath	16h	South of Mascot Plaza
SS-2	Rabindra Sharani	16h	Near City Bank
SS-3	Jashimuddin Road	16h	Advance Technology Dev.
SS-4	Shaheed Yusuf Road	16h	MP Check Post (Rajanigandha Market)
SS-5	Panthapath	16h	BFDC Rail Crossing
SS-6	Shaheed Shahidullah Kaiser Road	16h	Bangla Academy
SS-7	Sir Sayed Ahmed Road	16h	Dhaka Medical College Gate
SS-8	Zahir Raihan Sharani	16h	Nimtali Bazar (West of Nazimuddin Road)
SS-9	Chalk Mughaltuli Road	16h	Barakatra
SS-10	Uttara-Tongi Road	16h	Tongi Bridge
SS-11	Sat Masjid Road	16h	Abahani Sport Ground
SS-12	Jail Road (Nazimuddin Road)	16h	Dhaka Central Jail
SS-13	Abul Hasnath Road	16h	Janata Bank
SS-14	Azimpur-Lalbag Road	16h	Near Azimpur Post Office
SS-15	Nawabpur Road	16h	District Council Office

SL	Name of North-South Screen Line	Survey Hours	Traffic Count Station
SS-16	Narinda Road	16h	Baldha Garden
SS-17	Shaheed Fazle Rabbi Road	16h	Joykali Mandir
SS-18	HaBDThola Road	16h	Tikatuli
SS-19	Dhakeswari Road	16h	Dhakeswari Mandir
SS-20	Gabtali-Hazaribag Embankment Road	16h	Shyamoli Housing
SS-21	Mohammadpur-Hazaribag Embankment Road	16h	Intellectual Martyr Monument
SS-22	Companyghat-Raj Narayan Dhar Embankment Road	16h	Bou Bazar
SS-23	Kazi Alauddin Road	16h	Nazira Bazar
AS-1	Shaheed Tajuddin Road	16h	Mohakhali ICDDRB
AS-2	Nabisco-Gulshan 1	16h	Aarong
AS-3	Saidabad Road	16h	Khilgaon Colony
AS-4	New Circular Road	16h	Rajarbag Police Line
AS-5	Kakrail VIP Road	16h	Hotel Rajmoni Isha Khan
AS-6	HaBDThola Road	16h	Jatrabari petrol Pump
AS-7	Mirpur 1 – Mirpur 10	16h	Grameen Bank
AS-8	Bijoy Sharani	16h	Army Museum
AS-9	Farmgate – Manik Mia Avenue	16h	Khamarbari and Indira Road
AS-10	Agargaon-Prime Minister Office Link Road	16h	In front of Army Museum

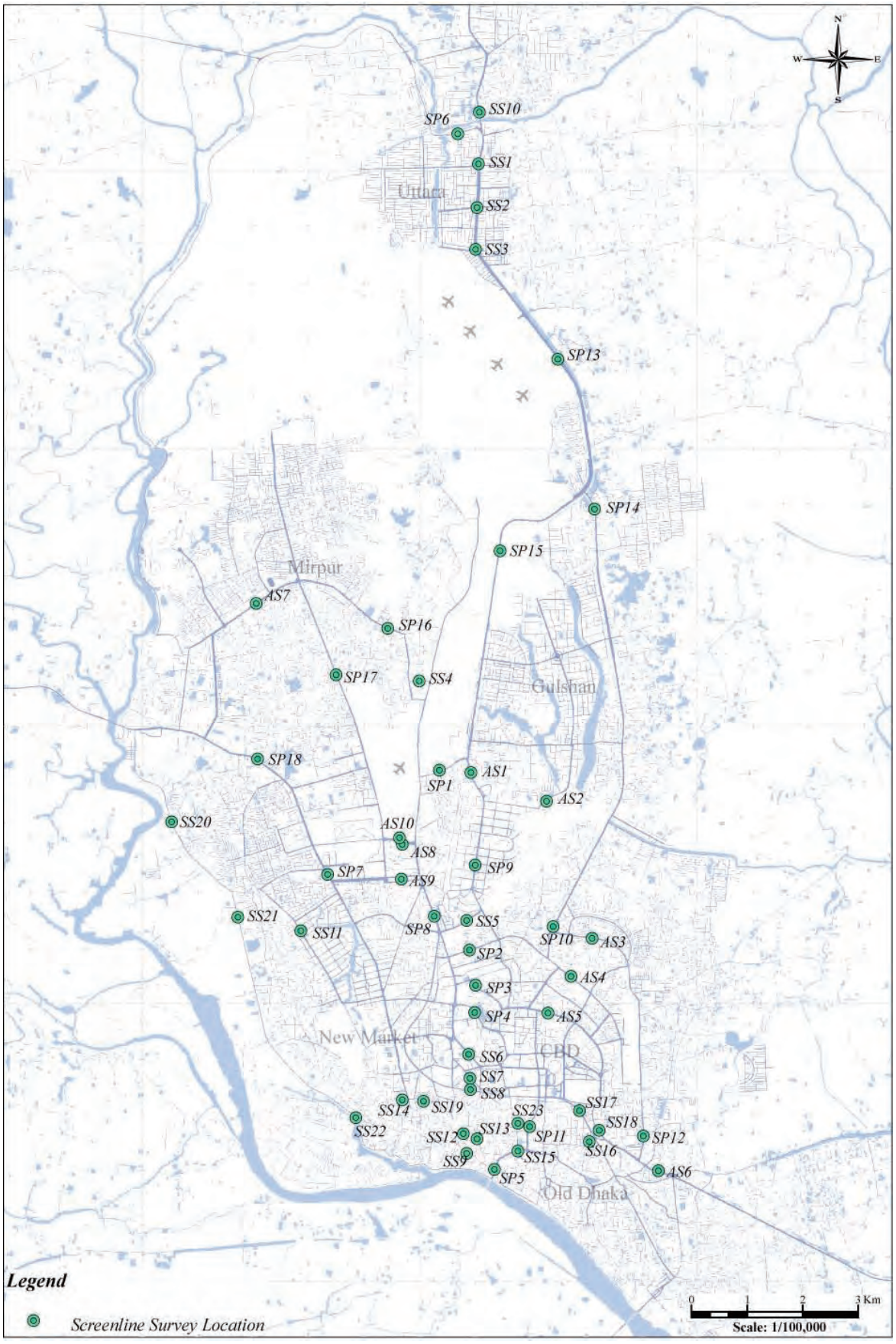


Figure 1.3-2 Survey Locations of Screen Line Survey

1.3.2 Results and Analysis

(1) Hourly Traffic Volume

The peak ratio can be calculated by dividing traffic of both directions in peak hour with the total number of vehicle trips counted during the survey period. The peak ratio varies which ranges from 5.0% to 12.0%. In addition, the peak hour does not occur in the morning at most of locations. It has a tendency that the peak hour is observed in the evening especially after 17:00hrs.

There is a difference of the characteristics with respect to a peak of traffic and traffic volume of motorized (MT)/non-motorized (NMT) transport.

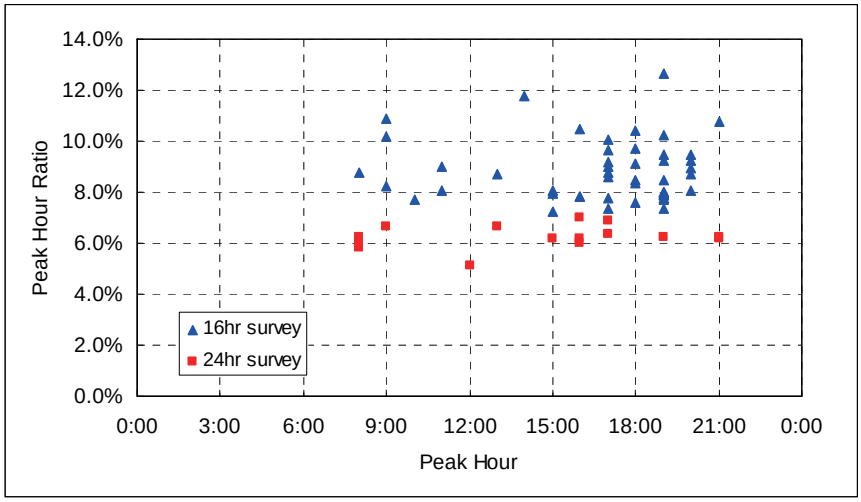


Figure 1.3-3 Survey Locations of Cordon and Screen Line Survey

Table 1.3-3 Peak Ratio and Peak Hour

Location	24h/16h	Peak Ratio	Peak Hour
CL01	24h	5.1%	12:00
CL02	24h	6.0%	16:00
CL03	24h	6.2%	15:00
CL04	24h	6.3%	19:00
CL05	16h	8.1%	11:00
CL06	16h	9.7%	18:00
CL07	16h	10.4%	18:00
CL08	16h	8.5%	19:00
CL09	16h	10.2%	19:00
CL10	16h	12.6%	19:00
CL11	16h	11.7%	14:00
CL12	16h	8.7%	20:00
CL13	16h	9.2%	19:00

Location	24h/16h	Peak Ratio	Peak Hour
AS01	16h	7.3%	15:00
AS02	16h	7.8%	16:00
AS03	16h	7.6%	18:00
AS04	16h	9.5%	19:00
AS05	16h	8.1%	15:00
AS06	16h	7.9%	19:00
AS07	16h	9.0%	20:00
AS08	16h	8.4%	18:00
AS09	16h	9.0%	17:00
AS10	16h	8.8%	8:00

Location	24h/16h	Peak Ratio	Peak Hour
SS01	16h	9.2%	20:00
SS02	16h	9.1%	18:00
SS03	16h	8.5%	18:00
SS04	16h	8.0%	19:00
SS05	16h	7.8%	16:00
SS06	16h	10.1%	17:00
SS07	16h	10.2%	9:00
SS08	16h	8.7%	17:00
SS09	16h	8.3%	9:00
SS10	16h	7.9%	15:00
SS11	16h	7.7%	10:00
SS12	16h	10.5%	16:00
SS13	16h	9.7%	17:00
SS14	16h	10.8%	21:00
SS15	16h	9.2%	17:00
SS16	16h	8.7%	13:00
SS17	16h	9.5%	20:00
SS18	16h	8.6%	17:00
SS19	16h	10.9%	9:00
SS20	16h	7.7%	19:00
SS21	16h	8.0%	19:00
SS22	16h	7.7%	19:00
SS23	16h	9.0%	11:00

Location	24h/16h	Peak Ratio	Peak Hour
SP01	24h	6.7%	13:00
SP02	24h	6.1%	8:00
SP03	24h	6.3%	21:00
SP04	24h	5.8%	8:00
SP05	24h	7.0%	16:00
SP06	16h	8.0%	19:00
SP07	24h	6.2%	21:00
SP08	24h	6.3%	17:00
SP09	24h	6.6%	9:00
SP10	24h	6.2%	16:00
SP11	24h	6.9%	17:00
SP12	24h	6.2%	8:00
SP13	16h	7.8%	17:00
SP14	16h	7.9%	19:00
SP15	16h	7.3%	17:00
SP16	16h	7.4%	19:00
SP17	16h	8.0%	20:00
SP18	16h	7.9%	19:00

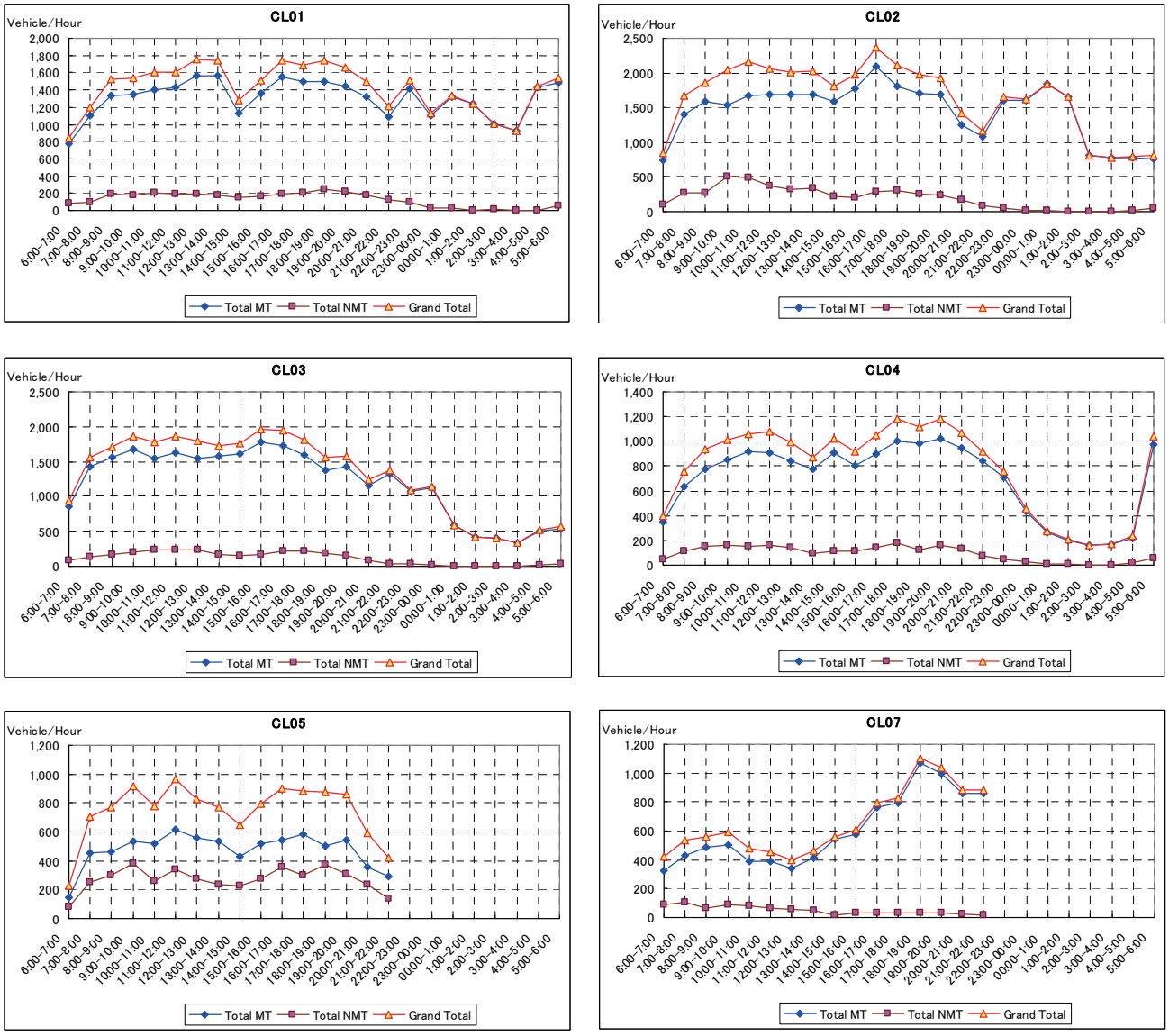
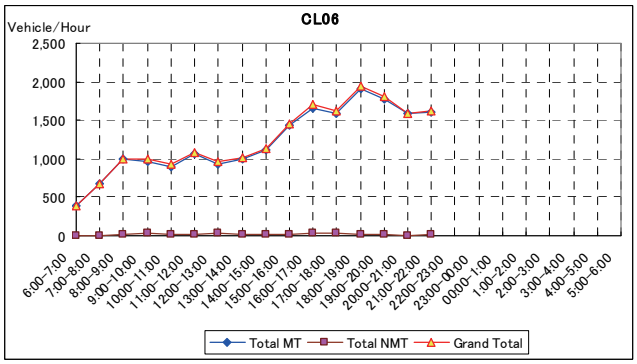
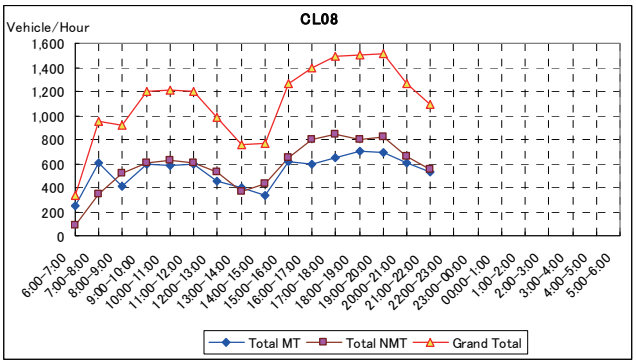
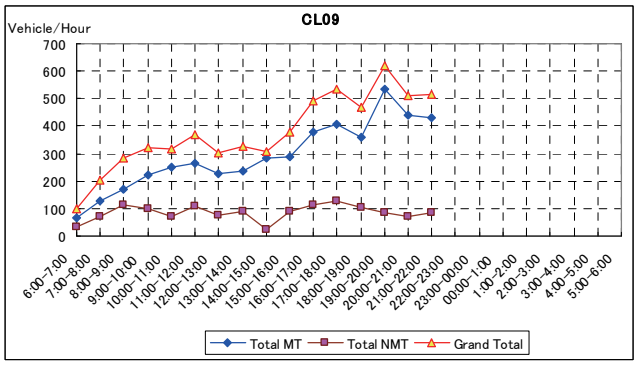
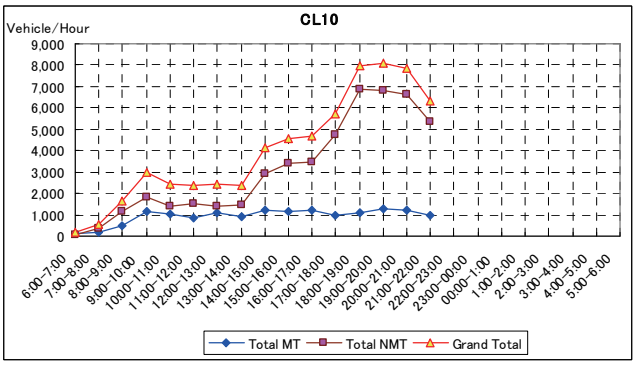


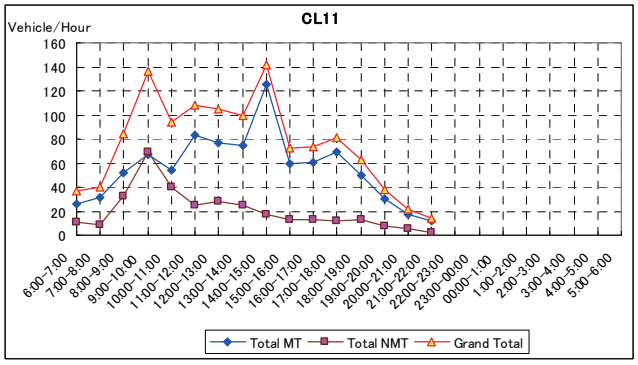
Figure 1.3-4 Hourly Traffic Volume (Cordon Line)

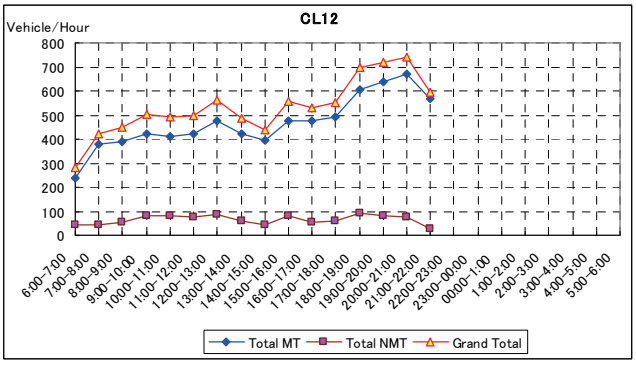












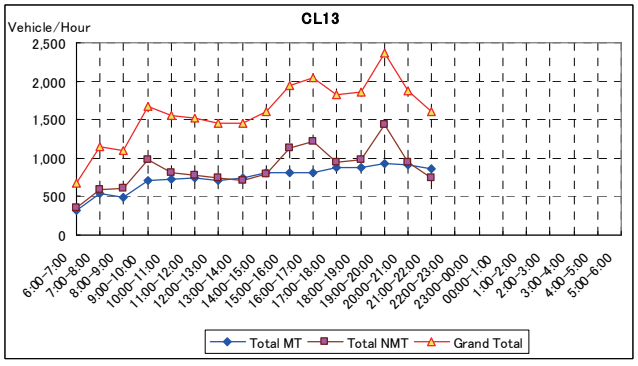
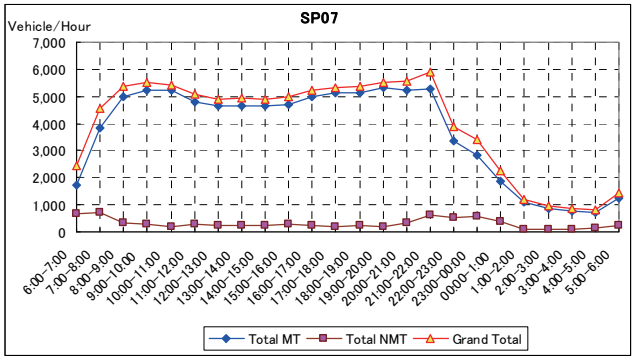
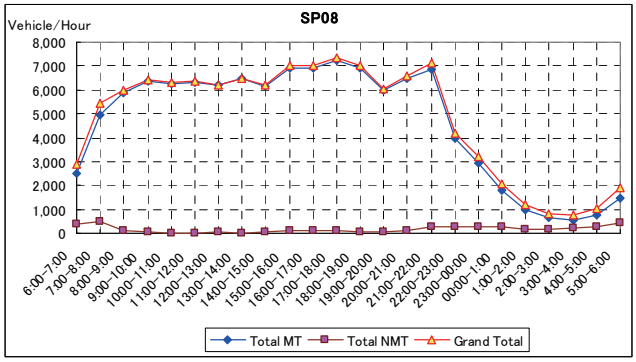
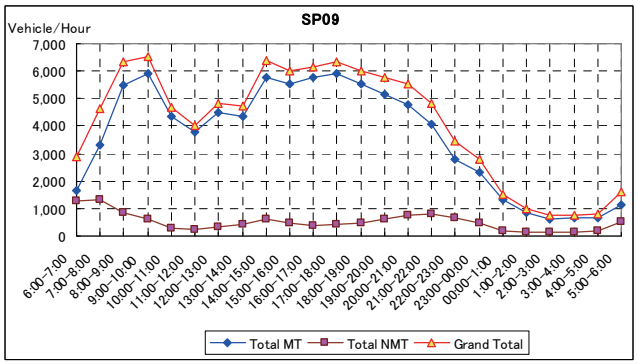
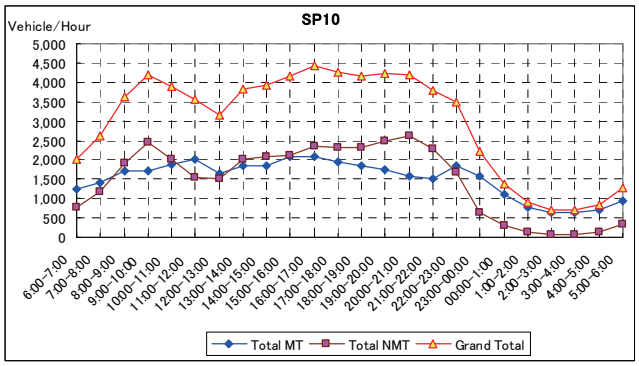


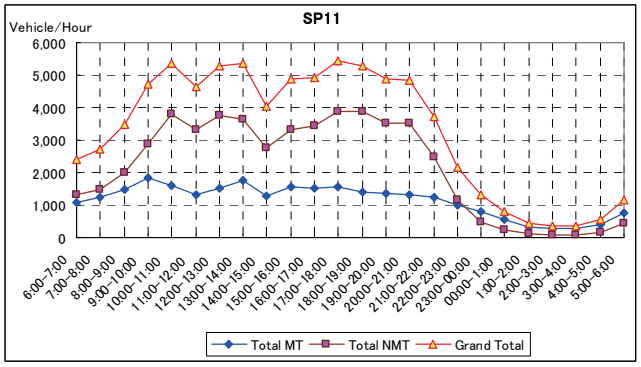
Figure 1.3-5 Hourly Traffic Volume (Cordon Line)

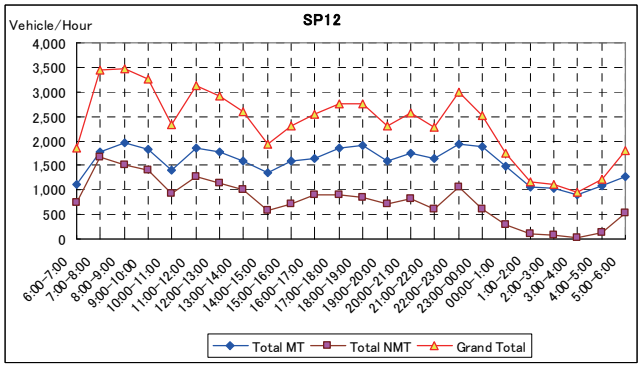


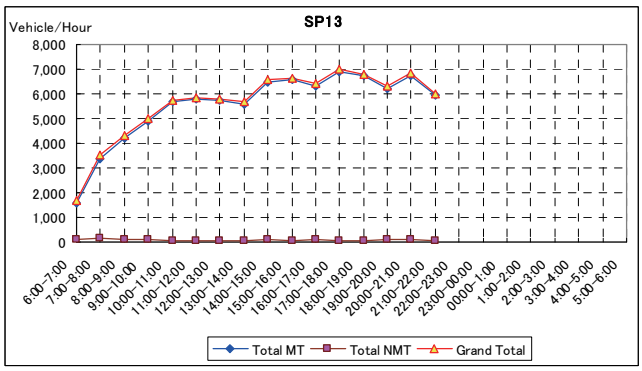












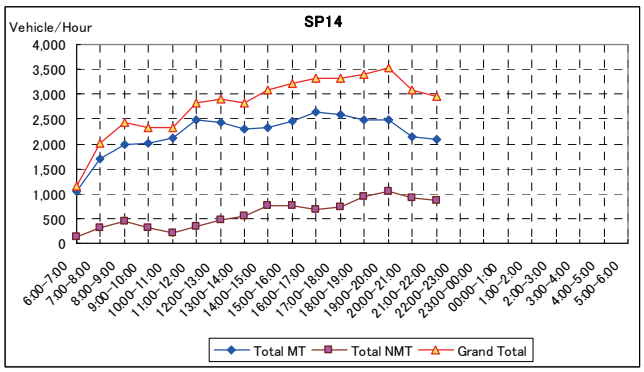
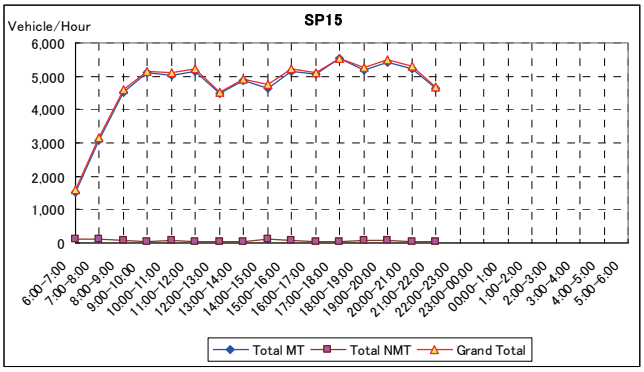
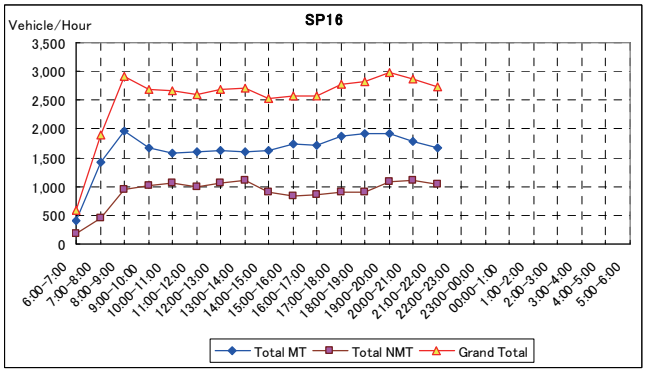
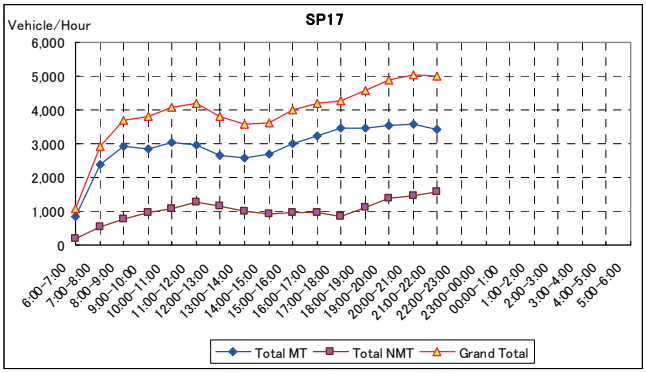
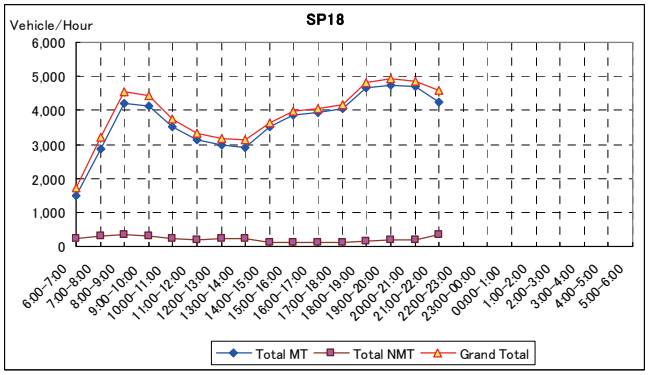


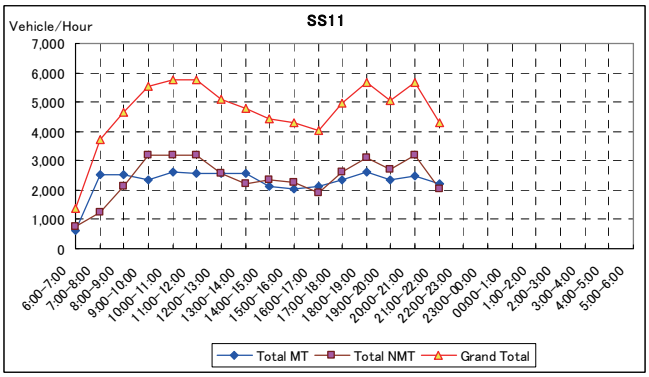
Figure 1.3-6 Hourly Traffic Volume (Screen Line)

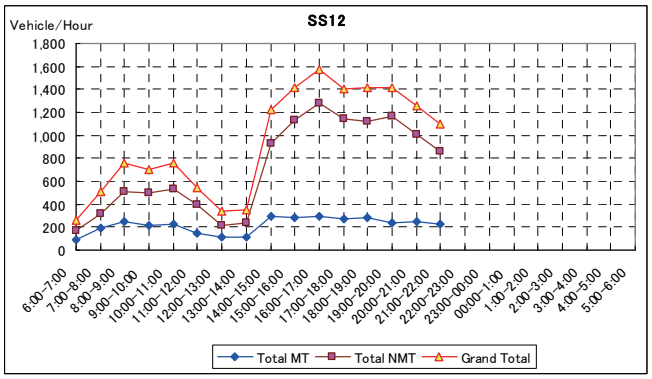


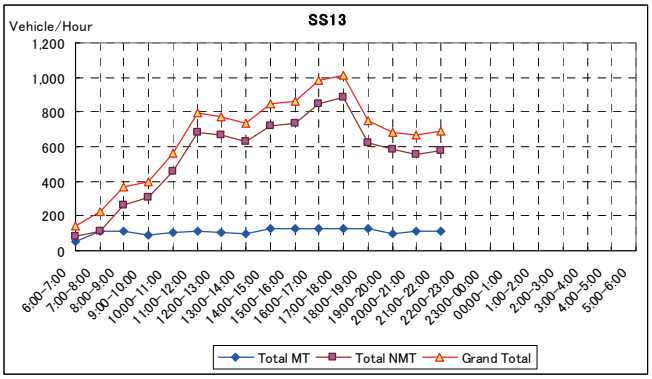












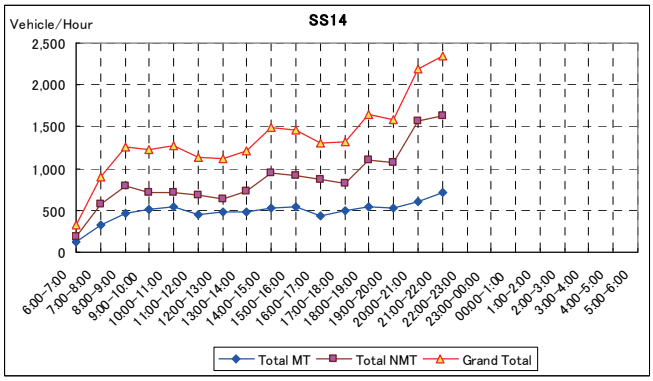
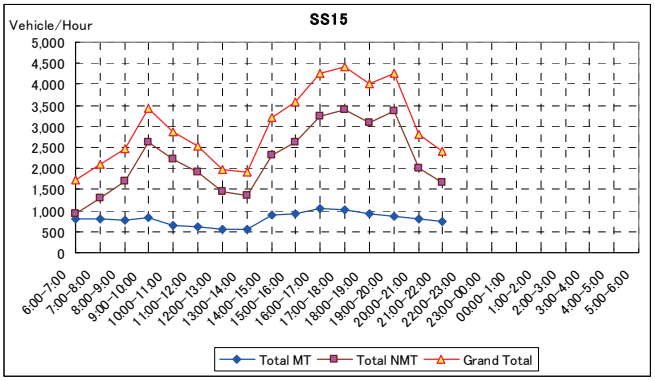
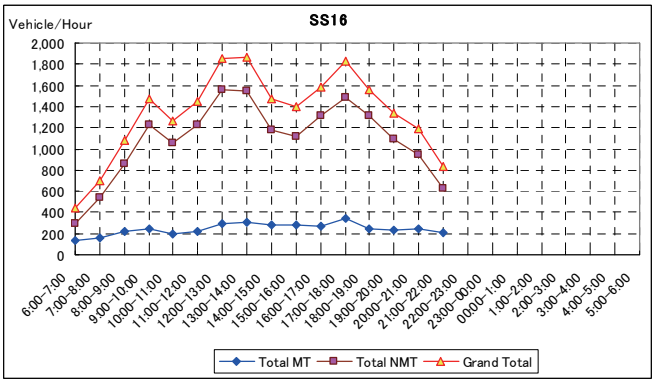
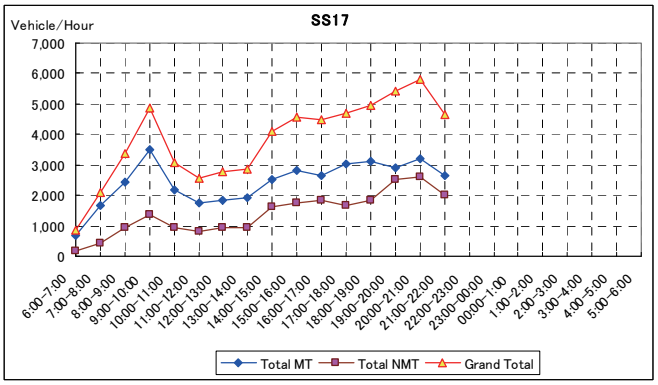
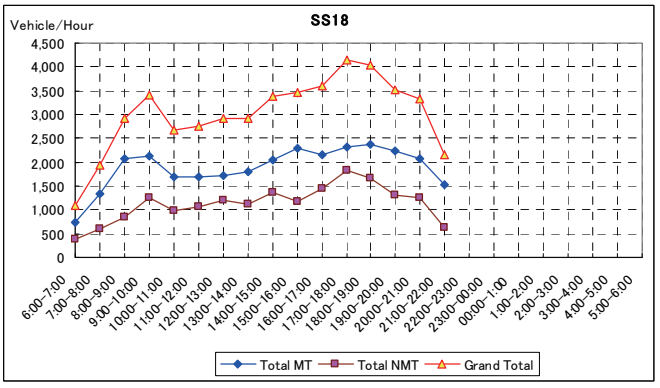


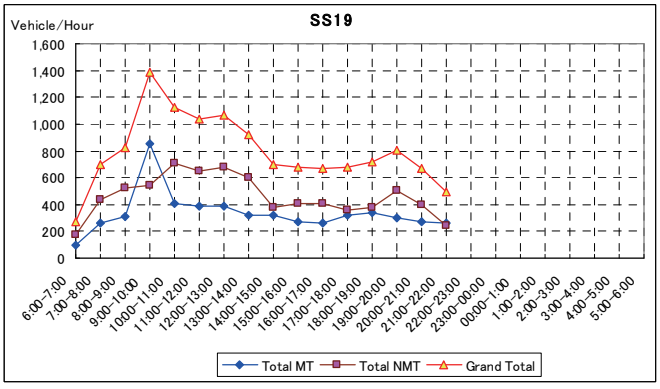
Figure 1.3-7 Hourly Traffic Volume (Screen Line)

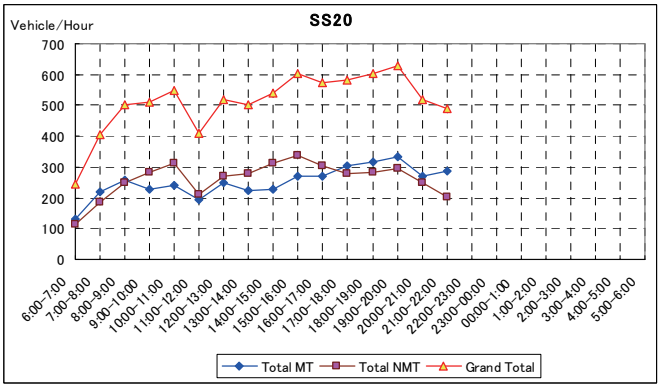


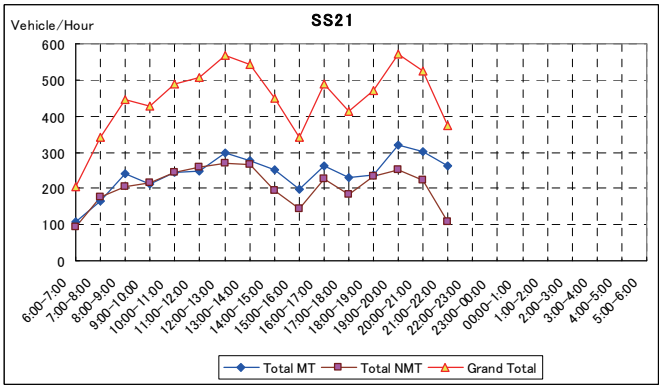












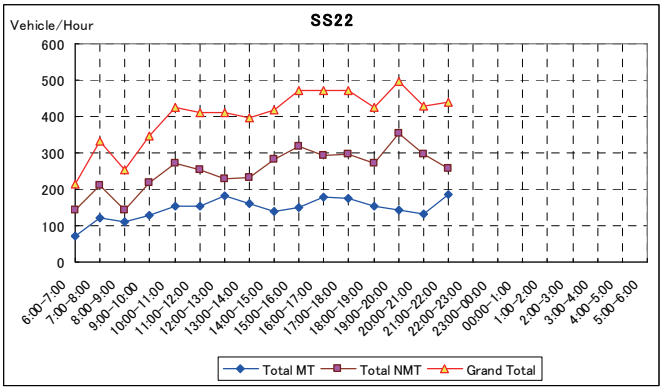
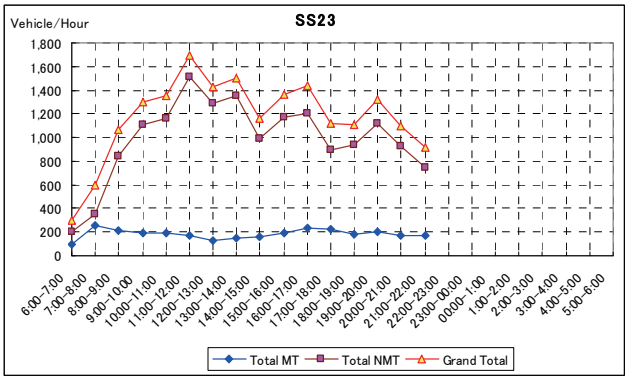
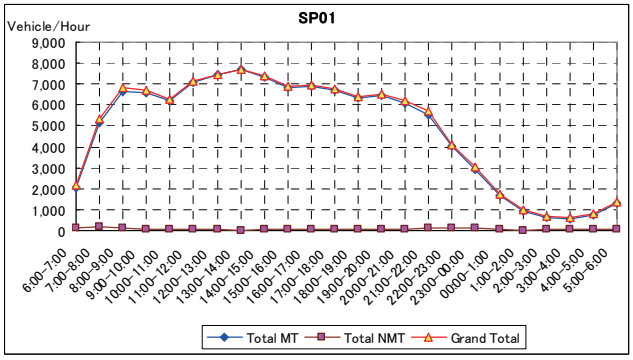
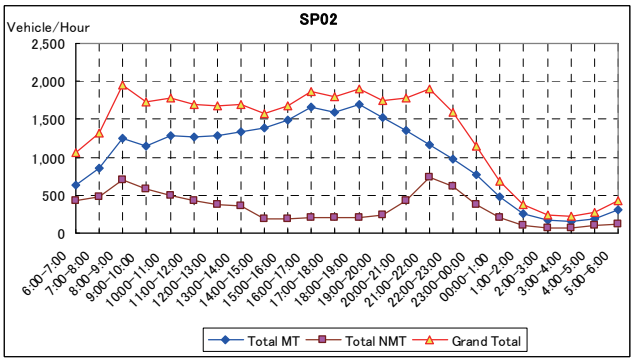
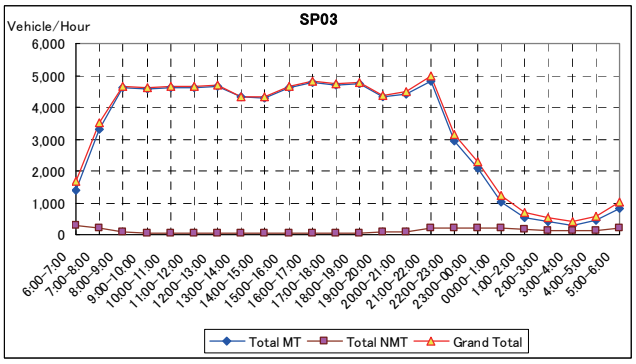


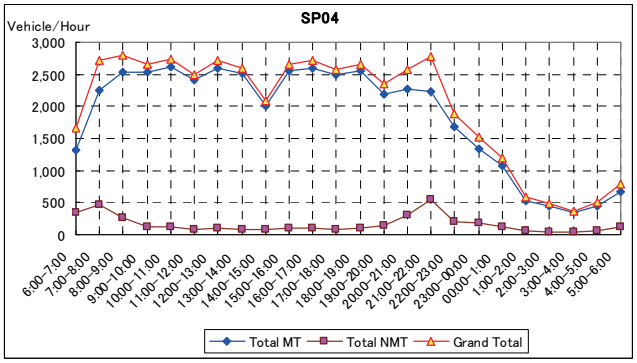
Figure 1.3-8 Hourly Traffic Volume (Screen Line)

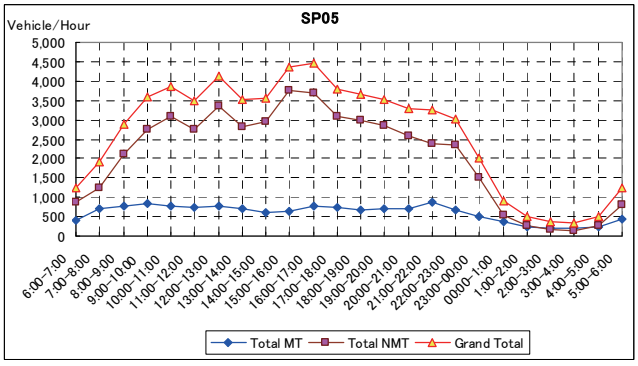












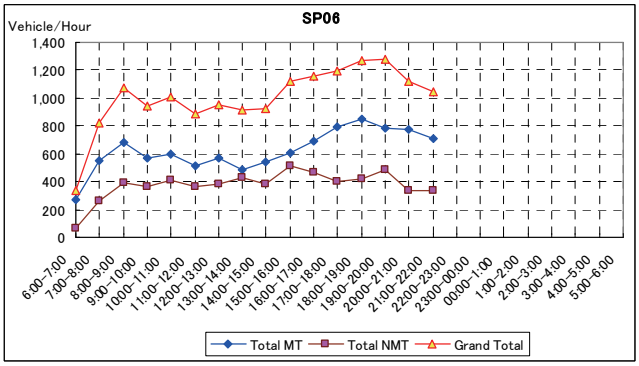
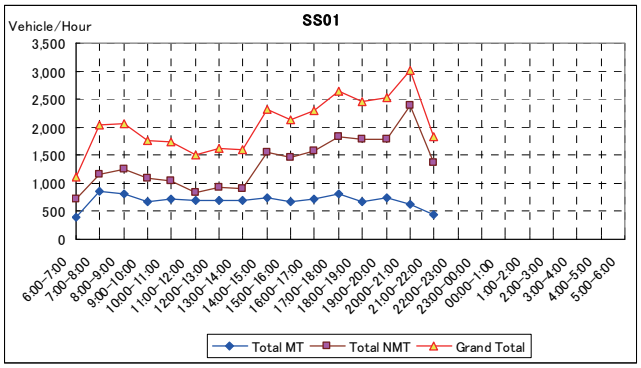
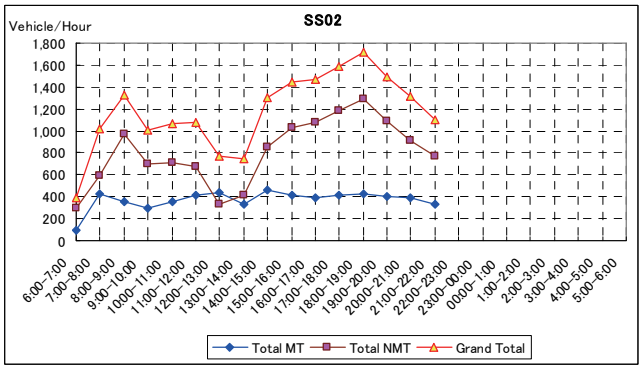
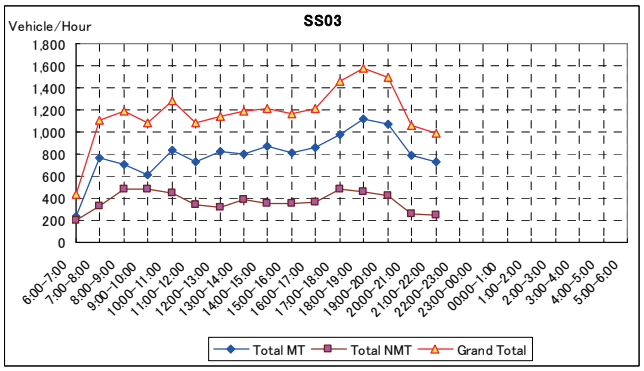
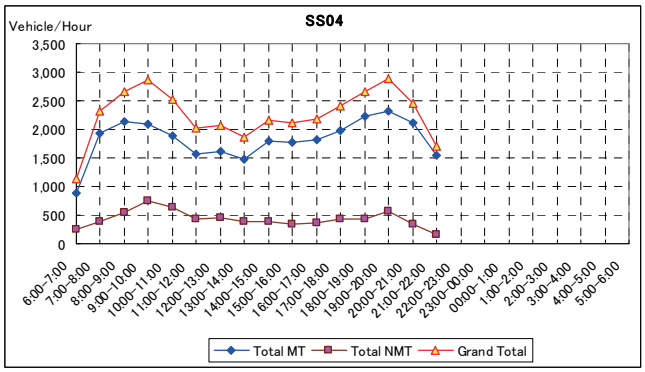


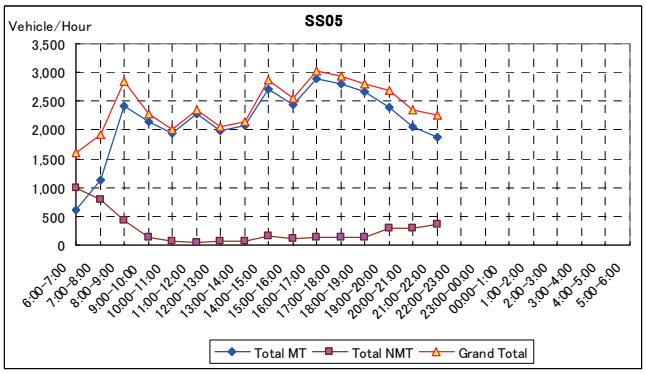
Figure 1.3-9 Hourly Traffic Volume (Screen Line)

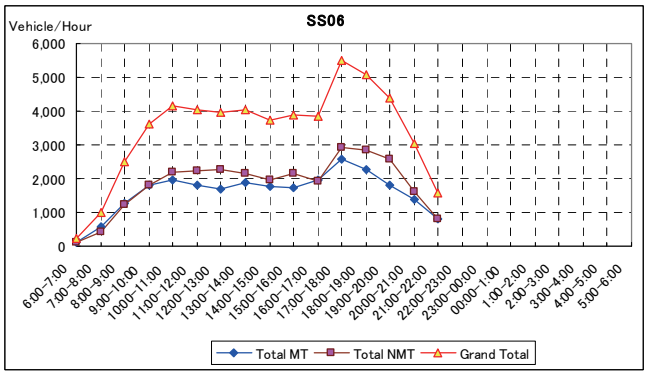


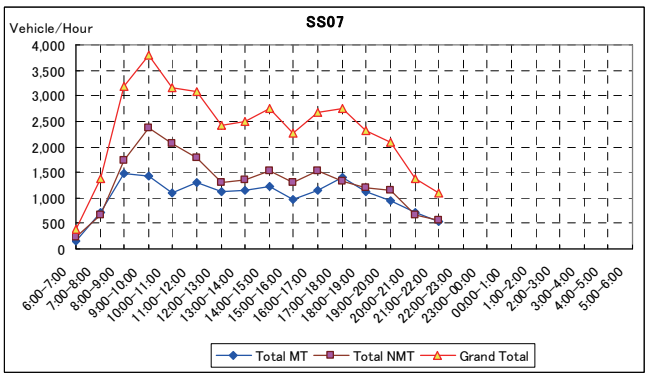












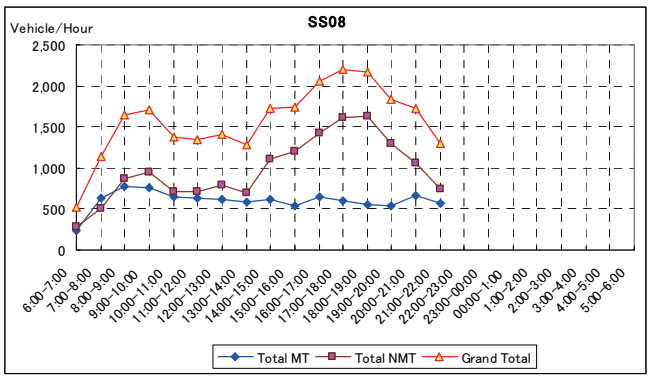
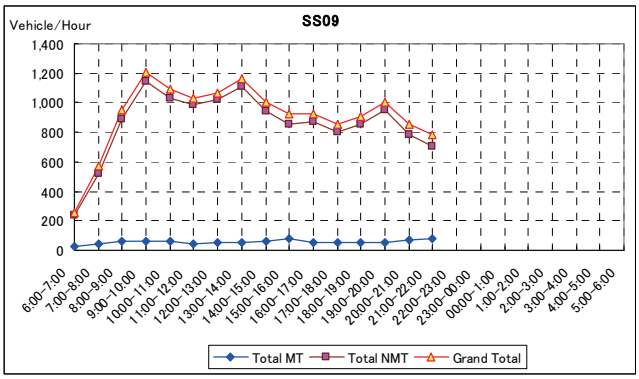
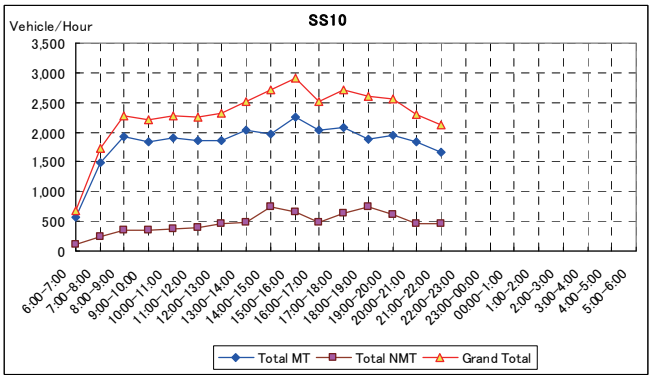
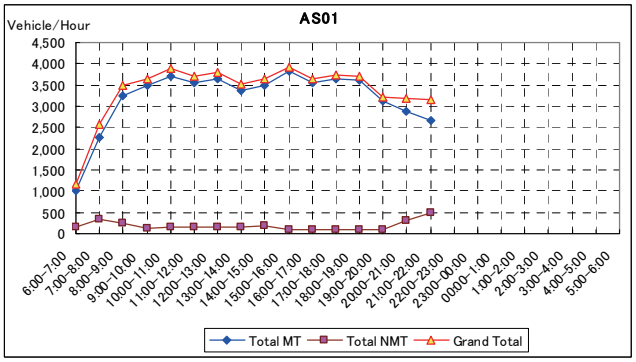
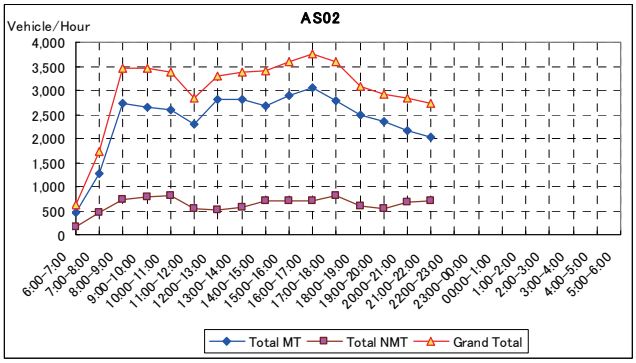


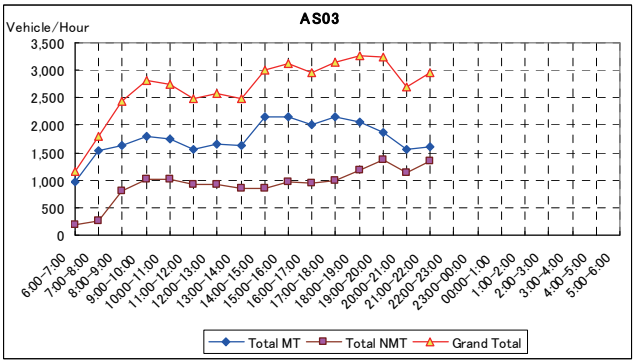
Figure 1.3-10 Hourly Traffic Volume (Screen Line)

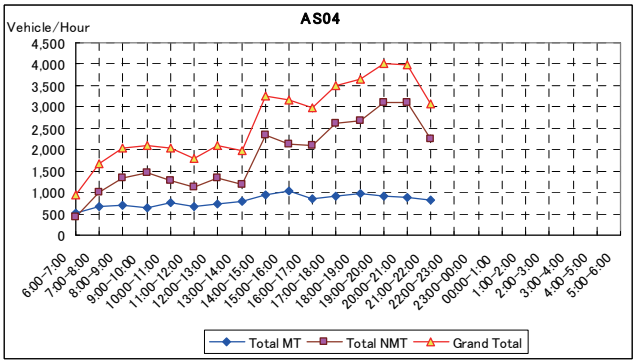


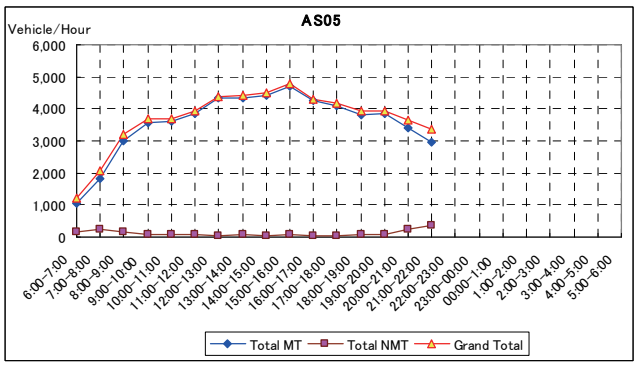












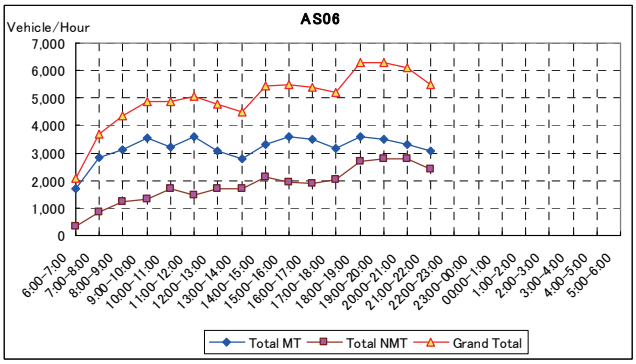


Figure 1.3-11 Hourly Traffic Volume (Screen Line)

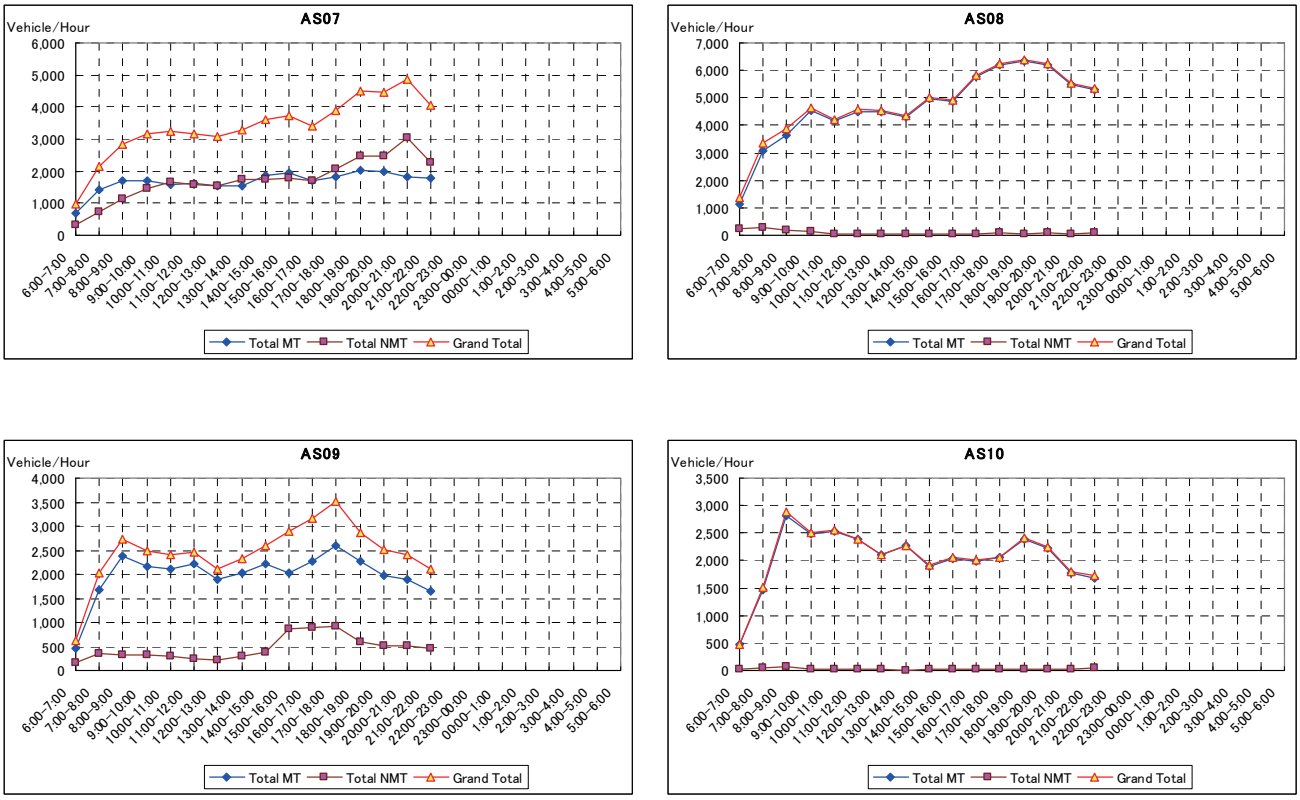


Figure 1.3-12 Hourly Traffic Volume (Screen Line)

(2) Modal Share

The following Figures exhibit the modal share at each survey location. At the survey locations of cordon line, the share of Truck is relatively higher than that of screen line, because there is no regulation for truck movement in the outskirt of DCC.

On the other hand, a non-motorized transport has dominant share in the residential area like Mirpur (AS07), Dhanmondi (SS11), and in the downtown area (SS12, SS13, and SS14).

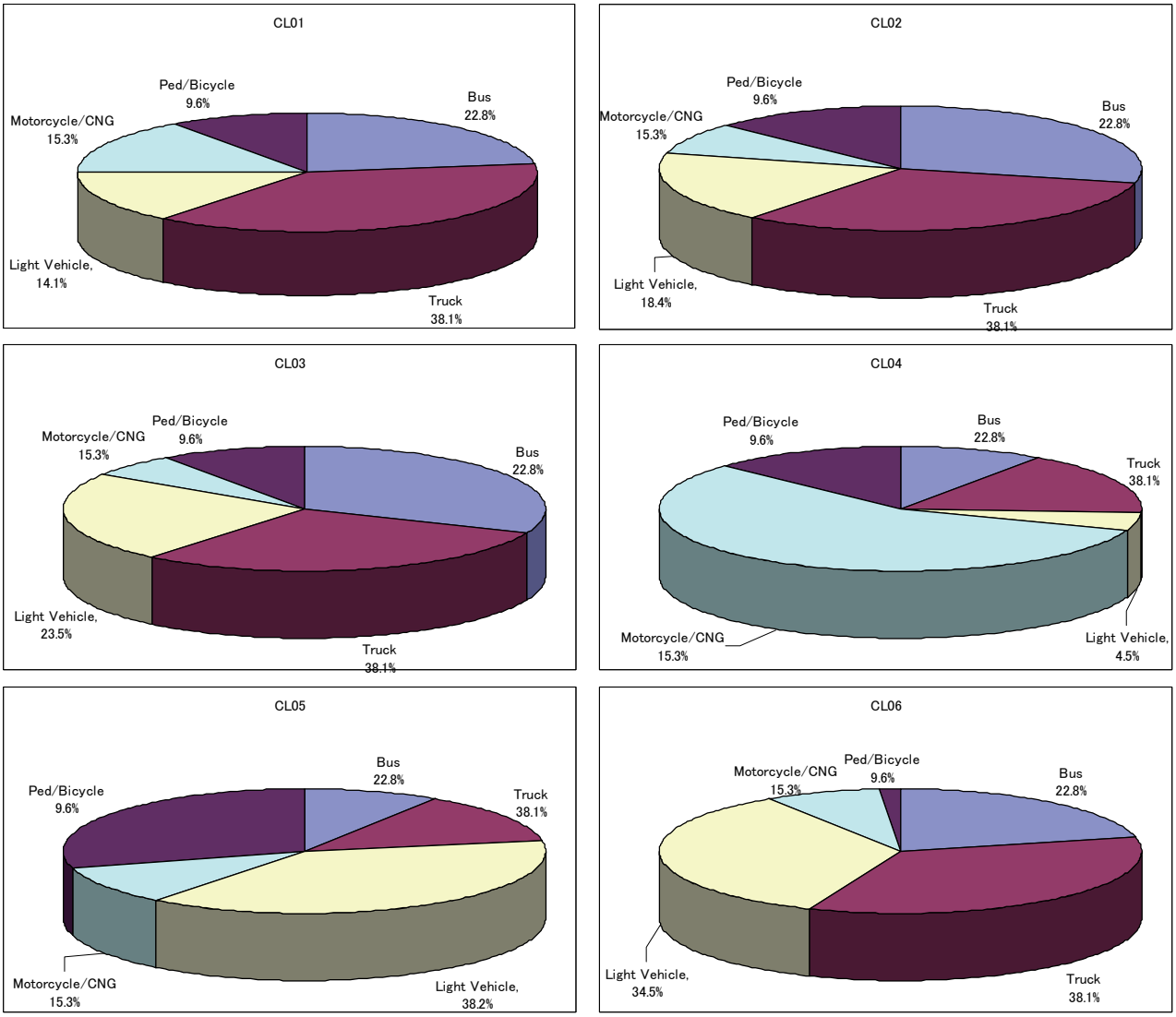


Figure 1.3-13 Modal Split at Each Location (Cordon Line)

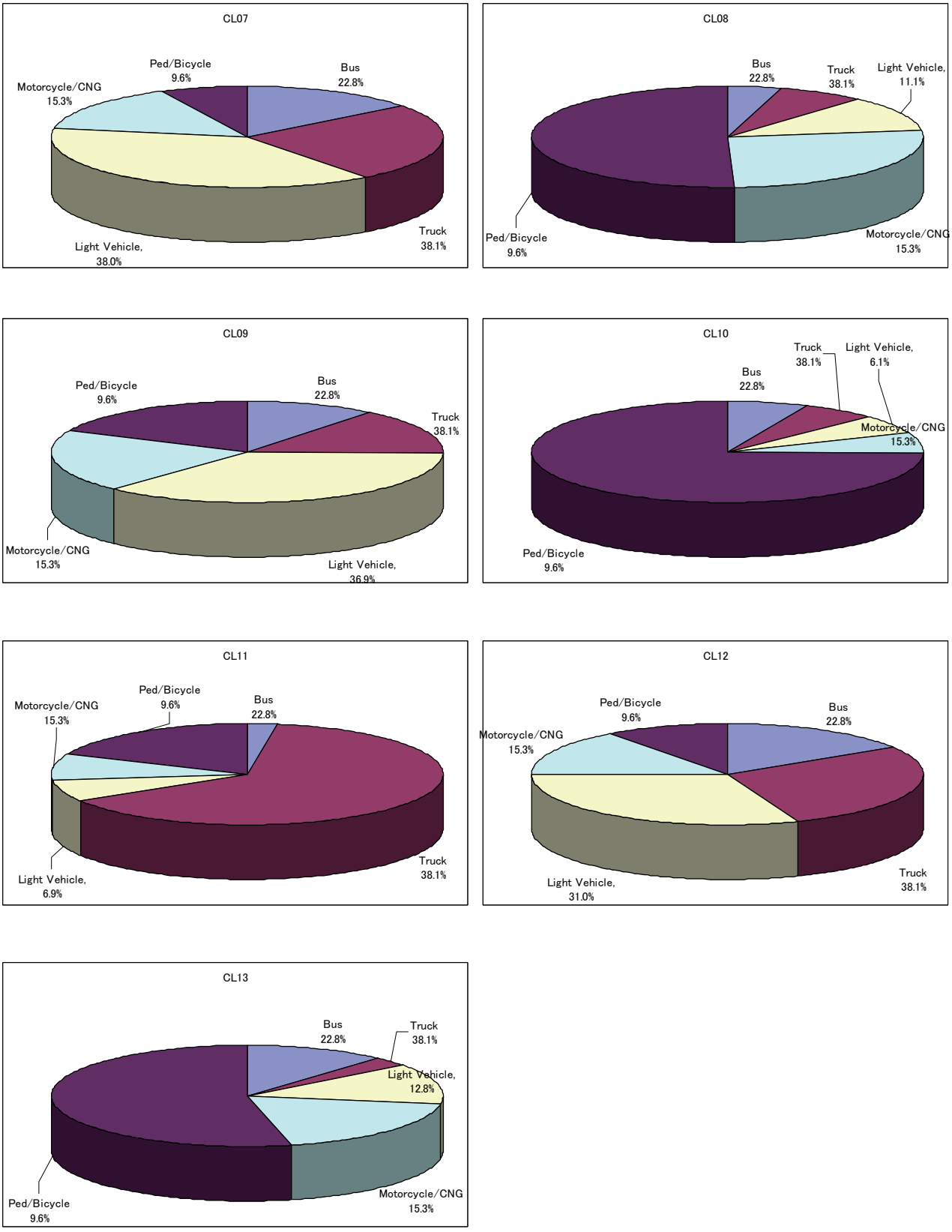


Figure 1.3-14 Modal Split at Each Location (Cordon Line)

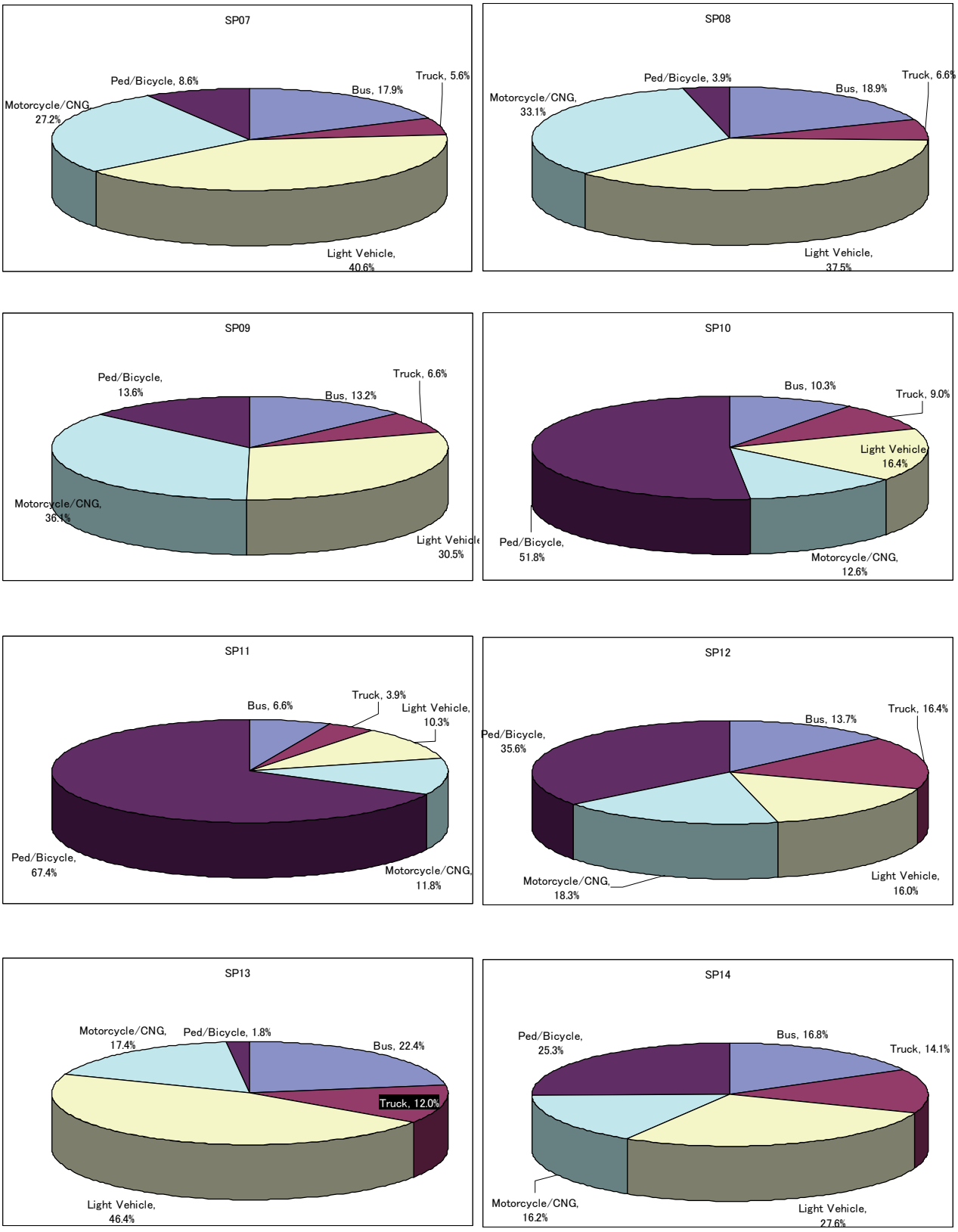


Figure 1.3-15 Modal Split at Each Location (Screen Line)

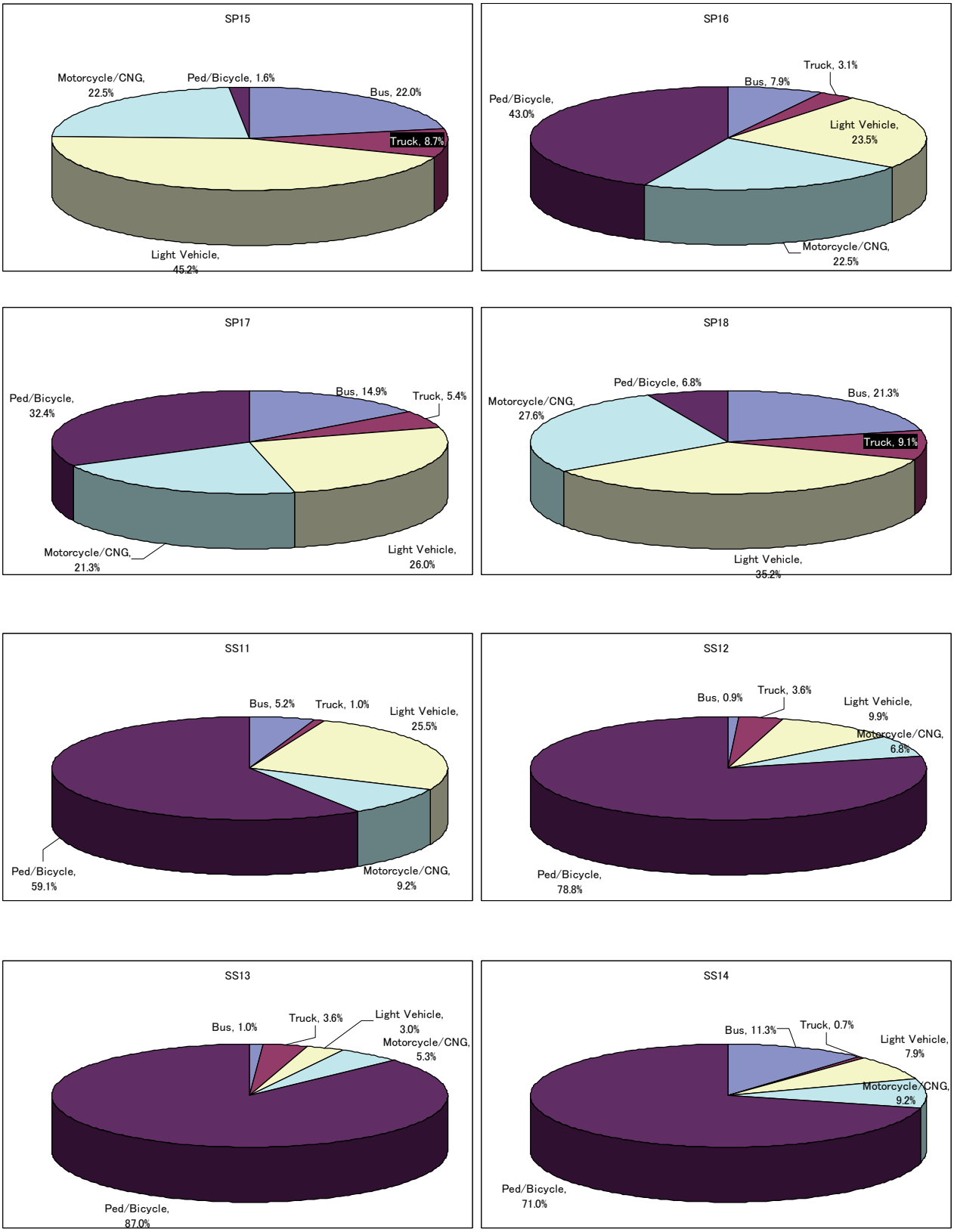


Figure 1.3-16 Modal Split at Each Location (Screen Line)

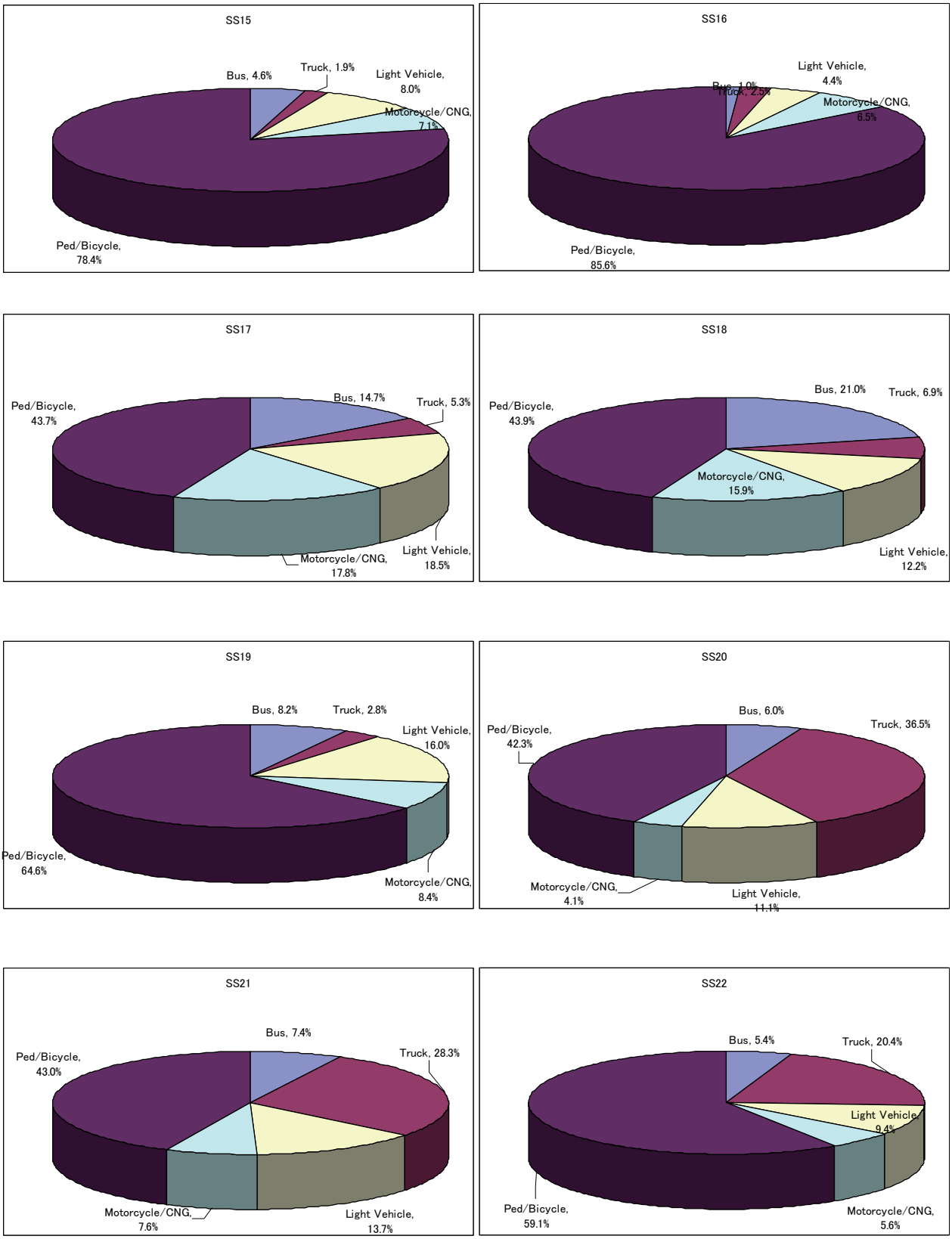


Figure 1.3-17 Modal Split at Each Location (Screen Line)

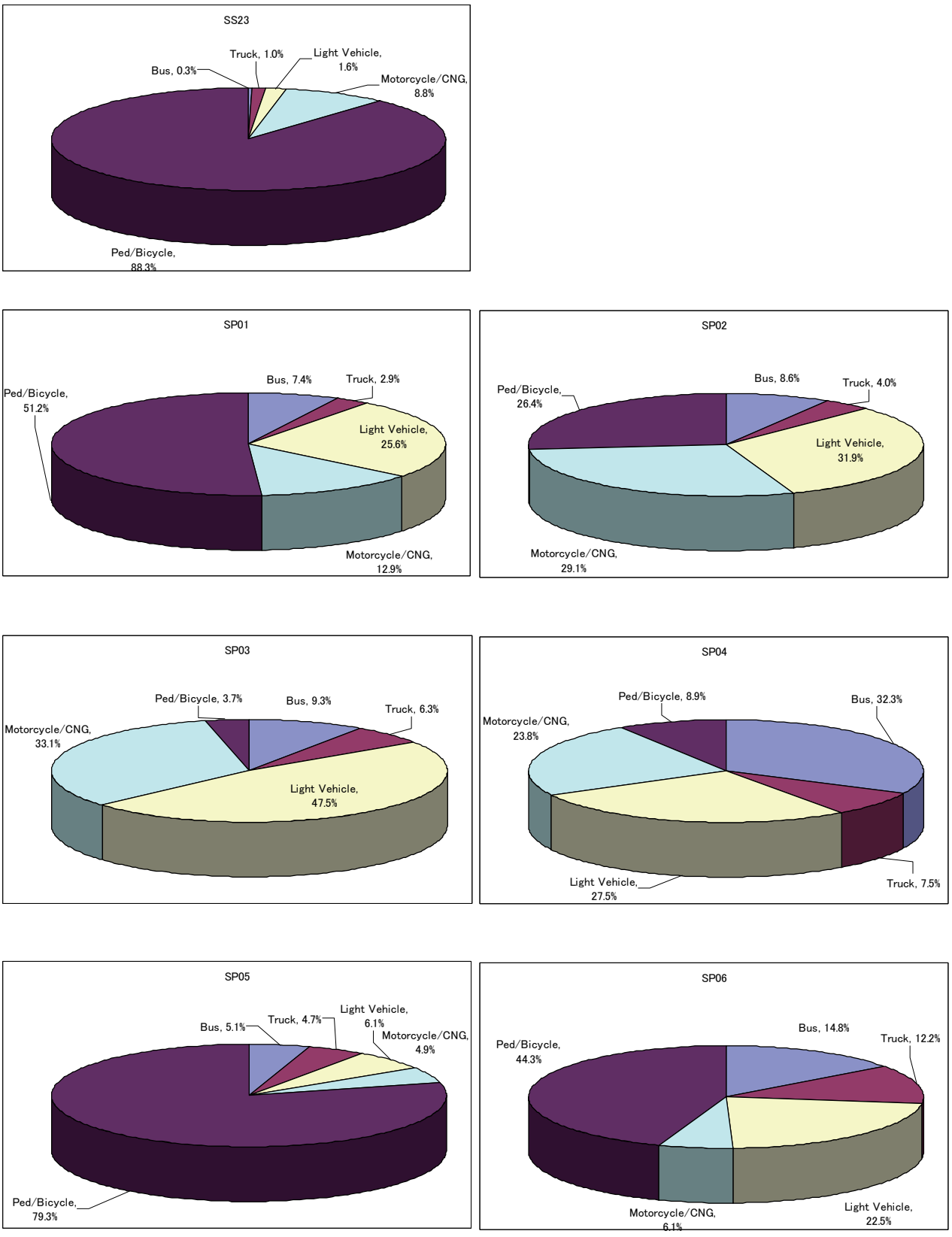


Figure 1.3-18 Modal Split at Each Location (Screen Line)

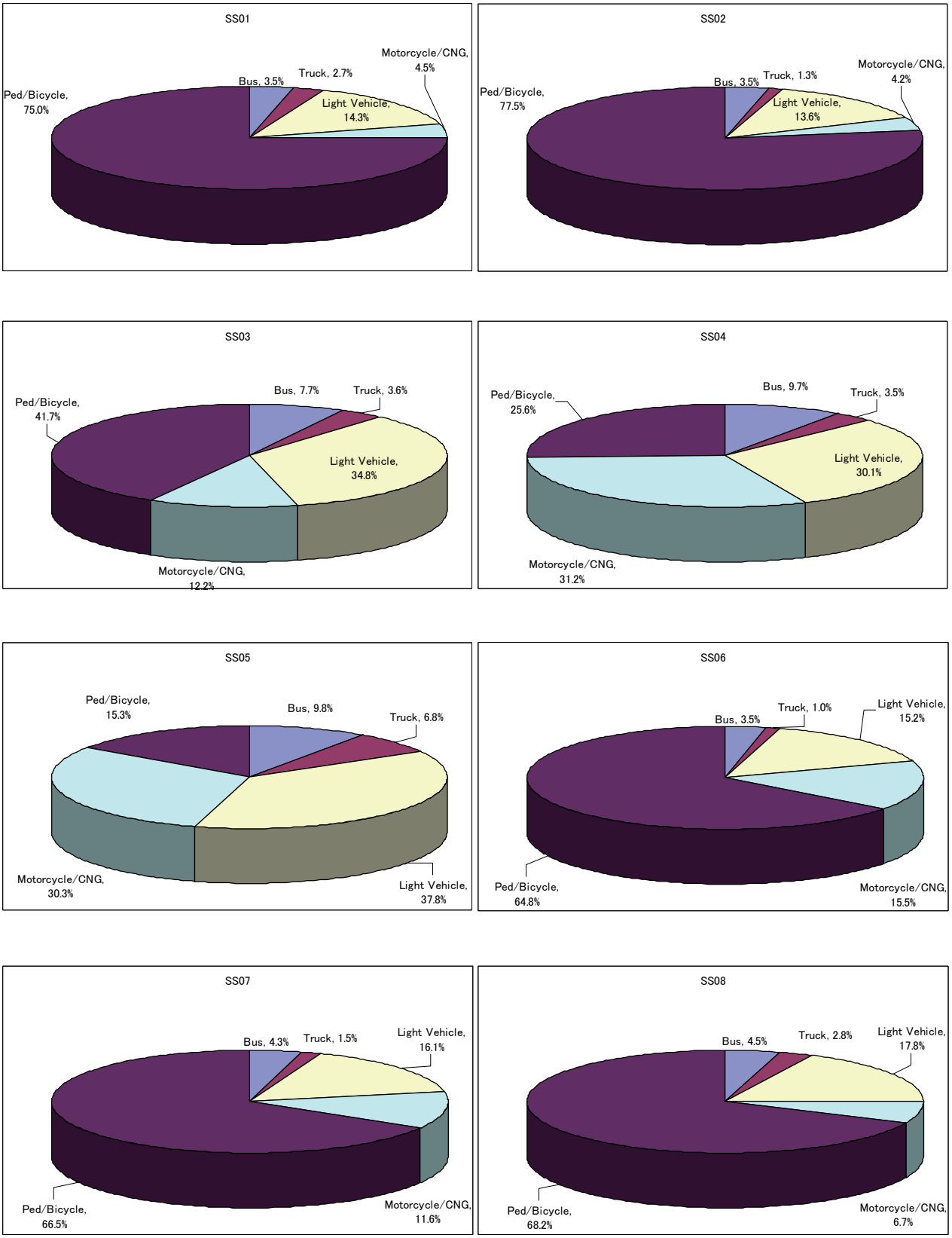


Figure 1.3-19 Modal Split at Each Location (Screen Line)

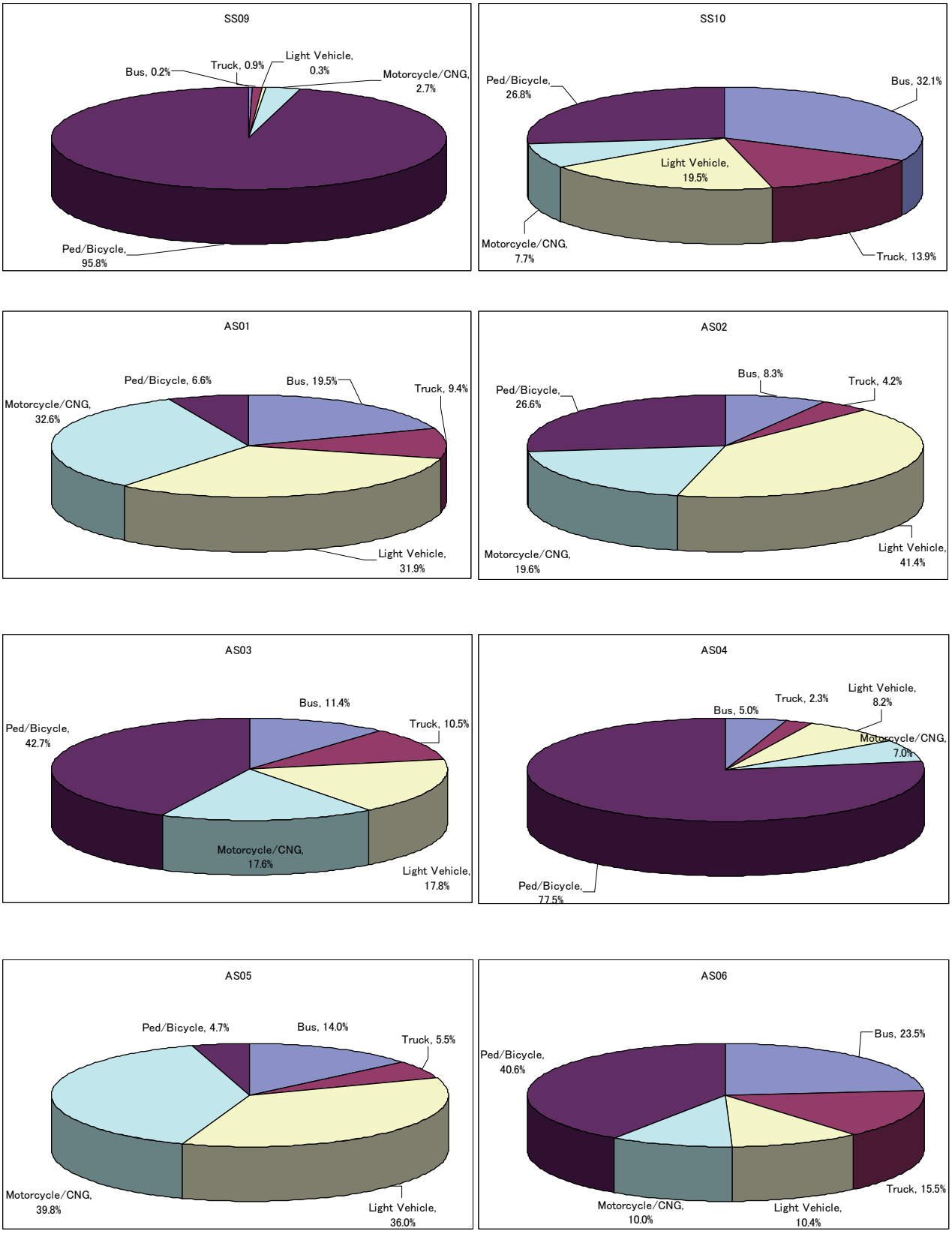


Figure 1.3-20 Modal Split at Each Location (Screen Line)

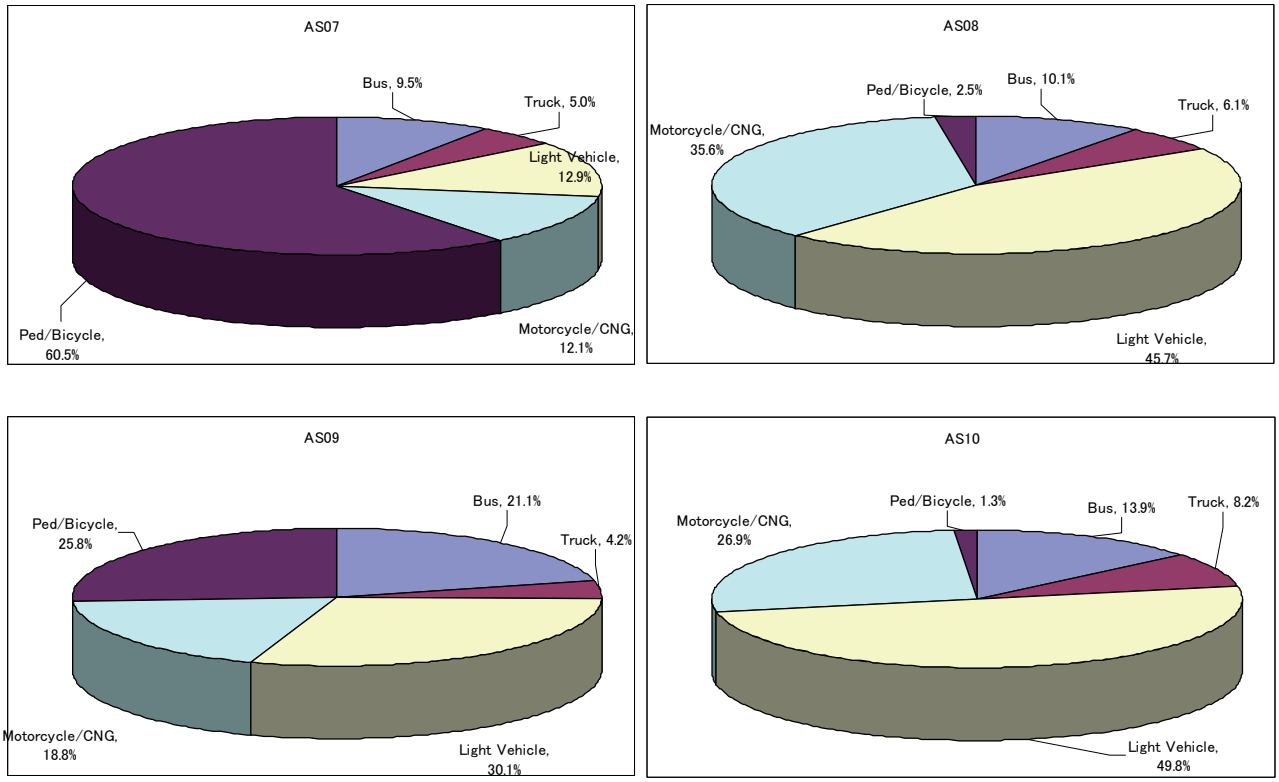


Figure 1.3-21 Modal Split at Each Location (Screen Line)