

### 3.5 Economic Activity

#### 3.5.1 Syria

Table 3.5.1 shows the Syrian GDP growth trend from 1990 to 1996. The average annual growth rate was 6.5%. This high growth mainly depended on:

- Rising levels of fixed investment related to a looser economic structure which has freed up private investment, and
- A large inflow of bilateral and Arab aid linked to Syria's role in helping Kuwait expel Iraq in 1991.

Components of high growth are as follows:

- The agricultural sector occupies around 20% of GDP. Through the 90s Syria has experienced a series of outstanding harvests in most areas of agriculture.
- The greatest contribution to the expansion of GDP has come from oil production, which has risen steadily from an average 400,000 barrels /day in 1990 to some 600,000 barrels /day in 1996.
- The manufacturing sector has grown rapidly over the past 10 years, mainly through the expansion of private sector activity. This has particularly affected the textile business, which using local cotton for material, has boomed since 1991.
- Transport & communications sector has also seen private investment grow. Tourist companies have intruded into the transport business for foreigners by providing services, and the number of bus companies using minibuses in the cities has proliferated and helped boost the overall growth of the private transport sector.

**Table 3.5.1 Gross Domestic Product by Sector, 1990-1996**

Sector	1990	1991	1992	1993	1994	1995	1996	1990-96 AAGR <sup>b</sup> (%)
Agriculture	17,891	19,099	22,661	22,805	23,990	24,895	26,134	6.5
Mining & Manufacturing	26,434	27,559	29,558	32,011	33,210	37,695	38,274	6.4
Building & Construction	2,257	2,485	2,556	2,878	3,047	3,535	3,373	6.9
Wholesale & Retail Trade	16,032	17,531	21,421	21,986	24,439	24,659	23,175	6.3
Transport & Communications	9,436	9,694	10,005	11,391	14,041	15,633	16,637	9.9
Finance & Insurance	3,974	4,190	4,797	5,530	5,809	6,011	6,728	9.2
Social & Personal Services	1,315	1,512	1,633	1,738	1,849	1,732	1,701	4.4
Government Services	12,063	13,723	13,302	13,899	13,330	13,620	14,612	3.2
Private Non-profit Services	83	90	98	108	113	124	136	8.6
<b>Total GDP</b>	<b>89,485</b>	<b>95,883</b>	<b>106,031</b>	<b>112,346</b>	<b>119,828</b>	<b>127,904</b>	<b>130,770</b>	<b>6.5</b>

Source: Statistical Abstract 1997, Central Bureau of Statistics

Note: <sup>b</sup> Average Annual Growth Rate, (at Constant Prices of 1985, million SP)

GDP per Capita of Syria in 1996 was estimated at US\$1,067, as shown in Table 3.5.2.

**Table 3.5.2 GDP per Capita, 1996**

Item	Value in 1996	Remarks
GDP (million SP)	655,124	At Current Market Prices
Population ('000)	14,619	Estimated Midyear Population
GDP per Capita (SP)	44,813	At Current Market Prices
GDP per Capita (US\$)	1,067	Neighboring Countries' Rate (NCR) of US\$1=SP42

Source: Study Team Estimates

From labor force employed (Table 3.5.2) and GDP at current price the labor productivity by sector are estimated as shown in Table 3.5.3. The number of labor force employed is 4,507 thousand persons which is 30.8% of the total population. The primary and secondary sectors employ almost the same number of labor force (about 1,300 thousand persons each). The tertiary sector presents the most job opportunities of 1,900 thousand. Labor productivity of the tertiary sector is the highest (164.8 thousand Syrian pounds per person), but difference among the sectors is not much.

**Table 3.5.3 Employed Labor Force, GDP and Productivity by Sector, 1996**

Sector	Employed Labor Force in thousand, (%)	GDP at Current Prices in million SP, (%)	Labor Productivity in thousand SP/person
Primary	1,289 (28.6)	176,607 (27.0)	137.0
Secondary	1,298 (28.8)	162,067 (24.7)	124.9
Tertiary	1,920 (42.6)	316,450 (48.3)	164.8
All Sectors	4,507 (100.0)	655,124 (100.0)	145.4

Source: Study Team Estimates

Assuming that the economic growth keeps the past trend, Syria's GDP in 1998 is estimated at about SP 713,000 million (at 1996 prices, see Chapter 9). Based on this assumption with the estimated population of 15.6 million, GDP per Capita in 1998 is calculated at US\$ 1,088 (by NCR of US\$1=SP 42).

### 3.5.2 Damascus City

As described in 3.3, the employed labor force in Damascus City in 1998 is 668 thousand persons (44.9% of the total population), of which 7 thousand persons are engaged in the primary sector, 174 thousand persons in the secondary sector and 488 thousand persons in the tertiary sector. Applying the above-mentioned productivity by sector, Gross Regional Domestic Product (GRDP) of the Damascus City is estimated as shown in Table 3.5.4.

**Table 3.5.4 Employed Labor Force and GRDP by Sector of Damascus City, 1998**

Sector	Employed Labor Force in thousand, (%)	Labor Productivity in thousand SP/person	GRDP at 1996 prices in million SP, (%)
Primary	7 (1.0)	137.0	959 (0.9)
Secondary	174 (26.0)	124.9	21,733 (21.1)
Tertiary	488 (73.0)	164.8	80,422 (78.0)
Total	669 (100.0)		103,114 (100.0)

Source: Study Team Estimates

GRDP of the Damascus City in 1998 is estimated at 103,114 million Syrian pounds, which occupies 14.5% of the projected GDP of 713,000 million Syrian pounds for this year. To the Damascus City's economy, the primary sector contributes only 1%, while the tertiary sector nearly 78%. GRDP per Capita in 1998 is estimated at US\$1,650, which is in US\$562 higher than US\$1,088 of the national average.

### 3.6 Household Income

Information on household income at the national level is not available to use. According to the Home Interview Survey (refer to Table 3.6.1), the average household income of Damascus City and the Study Area are SP 10,217/month and SP 9,328/month, respectively.

**Table 3.6.1 Household Income by Zone**

Zone no.	Zone name	Average income	Zone no.	Zone name	Average income
<b>A. Damascus City</b>					
1	Assad Addin	11,424	45	Aamara	10,643
2	Naqsh Bandi	10,432	46	Bab Touma	10,629
3	Ayubia	8,617	47	Bab Sharqi	16,389
4	Abu Jaash	8,452	48	Jourr	10,649
5	Saliheah	6,863	49	Dewania	11,203
6	Shoura	7,446	50	Qusser	16,553
7	Masstaba	9,315	51	Ma'monaya	8,553
8	Mrabut	9,772	52	Fars Khuri	8,491
9	West Malki	14,078	53	Qasser Al Ibad	8,895
10	Kiwan	19,579	54	Zeinabia	7,477
11	Rabwa	15,772	55	Aboun	10,063
12	Mazeh	13,281	56	Barzeh Town	8,804
13	Old Mazeh	12,147	57	Falooja	6,733
14	Dunmar	12,479	58	Karmil	10,016
15	Mazraa	10,717	59	Halteen	10,076
16	Rawda	15,432	60	Tadamann	7,086
17	Sarouja	5,043	61	Wahda	7,197
18	Hijaz	382	62	Dowelaa	7,567
19	Kanawat	8,365	Damascus City Average		10,217
20	Bab Sryja	13,530	<b>B. Study Area</b>		
21	Anssari	5,878	1-62	Damascus City	10,217
22	Baramka	15,518	63	Tall	14,656
23	Kafer Sussah	7,079	64	Sednaya	14,905
24	Lowan	7,932	65	Rankous	9,419
25	Qadam	8,768	66	Ein Al-Feejeh	5,141
26	Zahira	11,801	67	Dimas	4,808
27	Ka'ah	7,065	68	Qudsaya	8,392
28	Daqaq Mosq	6,830	69	Qatana	8,081
29	Ilaqra	9,453	70	Daraya	8,267
30	Bab Massr	15,294	71	Suhnaya	6,092
31	Midan Wastani	14,502	72	Kusweh	5,662
32	Bab Mussalla	8,500	73	Ghuzlanieh	5,345
33	Bifal	14,876	74	Babbyla	8,125
34	Dawanina	18,842	75	Jaramana	7,816
35	Amin	12,577	76	Muleiha	8,023
36	Souroji	14,344	77	Nashabyyah	12,748
37	Shaghour	7,838	78	Al-Auameed	5,292
38	Bab Aljabi	8,239	79	Kafar Batna	8,213
39	Soweqa	14,538	80	Arbeen	7,529
40	Tejari	10,308	81	Harasta	9,623
41	Ashahem Mosq	5,472	82	Douma	9,632
42	Qaynarya	5,222	83	Dumair	4,885
43	Aaqayba	10,629	63-83	Suburbs Average	8,496
44	Aqssar Mosq	15,133		Study Area Average	9,328

### 3.7 Vehicle Ownership

The government controls import of vehicles. Farmers earning foreign currency by selling their product in neighboring countries have the right to buy a pick-up. This is the reason why the number of pick-ups has significantly increased. Pick-ups are used not only for goods transport but also frequently for passenger transport. Investment Law No. 10 activated the public transport sector. The high increase rate in minibuses is due to that.

The average increase in vehicle number is 12.4% p.a. The increase of minibuses was 28.2%, and trucks and pick-ups 16.6%. On the other hand passenger cars increased by only 5.6% reflecting the strict car import controls enforced. Car ownership in Syria in 1996 was 30 units per 1,000 persons (refer to Table 3.7.1).

**Table 3.7.1 Number of Registered Cars in Syria**

Vehicle type/ Year (unit: vehicle)	1992	1993	1994	1995	1996	Average increase (%)
Passenger car	111,906	125,807	130,829	136,160	139,592	5.6
Bus	5,478	5,048	5,282	5,239	5,199	-1.3
Microbus	10,622	18,924	23,034	25,145	28,771	28.2
Truck	38,157	37,690	45,228	58,717	70,556	16.6
Pick-up	95,823	121,723	140,078	161,747	177,404	16.6
Tanker	2,753	2,981	3,102	3,567	3,491	6.1
Cars of temporary entry	5,936	6,432	6,353	7,163	7,081	4.5
Total	270,675	318,605	353,906	397,738	432,094	12.4
Population (1,000 persons)	--	--	13,782	14,153	14,619	3.0
Car ownership (per 1000)	--	--	26	28	30	7.4

Source: Transport Department, Damascus Governorate and Damascus Countryside Governorate

Note: Vehicles imported under Law no. 10 and Government cars are excluded

### 3.7.1 Number of Cars Registered and Car Ownership (Damascus)

Passenger cars occupy half of the total vehicles. However, increase rate of trucks was significant. An average increase between 1994 and 1996 was 7.3%, which reflects the good growth of the Syrian economy.

Although the car registration showed a high increase, car ownership was sustained at 34 units per 1,000 persons as a result of the increase in the population of Damascus.

After Law No. 10 was introduced, it became possible to import and register cars. These cars are separately registered and not included in the registration report figures. Government owned vehicles are also excluded. In order to clarify the registration figures, the registered numbers of vehicles of 1996 are listed in Table 3.7.2. Vehicles of ordinary registration account for 85.8%.

**Table 3.7.2 Number of Registered Cars in Damascus**

Vehicle Type/Year (unit: vehicle)	1994	1995	1996	1997*	Increase (%, 94-96)
Passenger Cars	70,461	72,234	73,597	67,927	2.2
Buses	2,107	2,083	2,102	1,097	-0.1
Micro Buses	8,127	9,065	9,540	9,322	8.3
Trucks	13,394	18,661	21,804	21,444	27.6
Pick-ups	30,083	34,094	36,316	33,647	9.9
Tankers	762	774	817	282	3.5
Cars of temporary entrance	4,003	4,168	4,281	1,788	3.4
Total	128,937	141,079	148,457	135,507	7.3
Passenger cars and pick-ups	100,544	106,328	109,913	101,574	4.6
Population ('000psn)	3,032	3,122	3,223	3,329	3.1
Car Ownership (per mill)	33	34	34	31	1.5

Note: \* Registered Vehicles as of October 31, Vehicles imported under Law No. 10 and Government cars are excluded

Source: Transport department of Damascus Governorate and Damascus Countryside Governorate

**Table 3.7.3 Number of Cars by Source - Damascus 1996**

Vehicle Type (unit: vehicle)	Registered as/under		
	Ordinal	Law No. 10	Government
Passenger car	73,597	5,837	6,533
Buses	2,102	294	189
Micro Buses	9,540	1,251	936
Trucks	21,804	423	3,370
Pick-ups	36,316	127	4,607
Tankers	817	31	912
Cars of Temporary Entrance	4,281	0	0
Total	148,457	7,963	16,547
Shares (%)	85.8	4.6	9.6

Source: Transport Department of Damascus Governorate and Damascus countryside Governorate

Damascus owns 35% of total cars registered in Syria. For passenger cars including taxi, Damascus owns more than half of Syrian total. Also ratio of passenger cars to all cars is more than half of all registered cars in Damascus as shown in Table 3.7.4.

**Table 3.7.4 Vehicle Share of Damascus 1996**

Type of Vehicle	Syria (vehicle)	Damascus (vehicle)	Share of Damascus (%)
Passenger Car	147,558	79,434	53.8
Buses	5,960	2,396	40.2
Micro Buses	31,905	10,791	33.8
Trucks	71,861	22,227	30.9
Pick-ups	177,615	36,443	20.5
Tankers	3,530	848	24.0
Cars of Temporary Entrance	7,081	4,281	60.4
Total	445,510	156,420	35.1

Source: Transport Department of Damascus Governorate and Rural Damascus Governorate.

Note: Excluding Government owned Cars

### 3.8 Government Budget

Reflecting the steady increase in GDP, Tax and Duty increased by 23.8% p.a. on average during the last five years. Other items of revenue also show steady increase, and the total amount of revenue increased by 14.5% p.a. on average in the last five years.

Expenditure also increased by 4.4% p.a. Balances of recent years kept a breakeven point as shown in Table 3.8.1.

**Table 3.8.1 Government Budget**

Year (unit: million SP)	1992	1993	1994	1995	1996	1997	Ave. Increase (93-97, %)
Revenue	93,043	123,018	144,163	162,040	188,050	211,125	14.5
Tax & Duty	29,408	29,489	40,456	48,903	57,371	69,296	23.8
Service & Property	4,858	5,658	6,643	7,186	12,473	18,574	34.6
Miscellaneous	36,816	35,197	40,903	46,157	53,929	48,108	8.1
Surplus on State Activities	16,127	18,504	18,578	23,147	32,870	44,516	24.5
Exceptional financing	5,834	34,170	37,583	36,647	31,137	30,631	-2.7
Foreign Loan	5,607	22,868	24,530	24,282	22,396	22,184	-0.8
Domestic Loan	0	11,026	12,742	12,039	8,441	8,071	-7.5
Expenditure	93,763	123,108	144,158	162,041	188,039	211,123	14.4
Government Service	63,329	71,809	85,937	98,944	110,714	116,168	12.8
of which National Sector	27,173	27,888	36,549	39,987	41,741	43,860	12.0
Agriculture, Forestry, Fisheries	10,910	12,240	12,761	15,292	19,443	24,220	18.6
Extractive Industries	2,684	3,197	3,160	5,099	5,856	8,471	27.6
Manufacturing Industries	3,921	10,942	14,214	10,834	11,524	14,033	6.4
Electricity, Water and Gas	4,935	12,671	15,969	17,814	24,056	27,004	20.8
Construction	912	204	691	1,236	1,281	1,216	56.3
Trade	1,262	1,477	1,695	1,807	2,278	3,435	23.5
Transport, Communication and Storage	3921	8098	6664	7509	8427	11012	8.0
Bank, Insurance and Real Estate	639	530	717	656	1120	1164	21.7
Unallocated Expenditure.	1250	1850	2350	2850	3350	4400	24.2
Balance	-720	-90	5	-1	1	2	

Source: Official Gazette

### 3.9 Land Use

#### 3.9.1 Study Area

The characteristics of land use in the Study Area are summarized as follows (see Figure 3.9.1):

- The Study Area covers an extended land area with a radius of 25-30 km of Damascus City. Its north to northwestern part is mountainous and south to southeastern part is flat. Damascus City is located at the foot of Mt. Kassioun.
- Urbanized areas of Damascus City are expanding in all directions beyond its administrative boundary. Even to the mountainous area of steep slope housing projects are proceeding, however much more to the flat agricultural lands within Ghouta.
- Every district center and some towns in Damascus Countryside Governorate form urban areas with a population of 4,000-105,000.
- Industrial areas are mainly located along the highway to Da'ra and also around Adra.
- In the mountainous area, places of steep slope are generally left unused, while parts of gentle incline are mainly used for non-intensive agricultural activities like pastures. Tourism spots are developed along the Barada River, the road to Tall-Sednaya and the road to Assad Village.
- In the flat area, intensively cultivated lands extend to the east and south of Damascus City within Ghouta.
- Areas outside Ghouta are sparsely used as agricultural lands.
- There are a considerable number of special use lands (mainly military sites) all over the Study Area.

### 3.9.2 Damascus City

The land use of Damascus City is deeply related to its historical background. It is considered that the existing Old City was built at the beginnings of the Roman period (around the 1st century AD) on the ruins of the Aramaean and Hellenistic cities. A wall was constructed and the city was divided by the Street Called Straight, which connected Bab Sharqi to Bab al-Jabieh.

During the Omayyad period (661 AD - 750 AD), the Omayyad Mosque was constructed. The growing population overflowed the wall and formed suburban areas like Shaghour, Midan, and Kanawat. Within the wall, increasing houses in its limited area created labyrinthine passageways. A canal was constructed to divert water from the River Barada to conduits that provided houses, both inside and outside the Old City, with water.

The Citadel was constructed at the beginning of the 13th century, to defend the city from Crusader attacks during the Ayyubid Dynasty.

When the Mamluk Dynasty started, there was little room for building inside the Old City and so most Mamluk buildings that can be seen today are found outside the area of the Old City. Salhiyyeh underwent a surge of building and developed into a town. During this period, the Old City was completely surrounded by the suburban areas. The existing commercial and administrative zones extending to the west of the Old City originated from a thriving commercial area grown up around the Qasr al Aqsab (a palace for the governor of Damascus) that was built by the Sultan Baybars in the early Mamluk period on the same site of the present Tekkiyeh al Suleimaniyyeh. Along with the expansion of residential and commercial land use, many rural areas on the outskirts of the city were made into parks and gardens for rest houses.

During the 19th century under the Ottoman Dynasty (1516-1918), Damascus grew to twice its former size. The present Souq al Hamidiyyeh was established at that time.

The present structure of Damascus City was constructed through two city plans. The first one was designed by two French engineers (Danger and Eckoshar) in 1937 during the French colonial period and the second one was planned by a French and a Japanese planners (Eckoshar and Banshoya) in 1968 which is still the official development plan of the city. The road network pattern of the present central part of Damascus with many roundabouts was brought about by the first plan.

There are many informal housing areas that have been developed since the early 1950's and accelerated during the 1980s as housing shortage became serious. "Informal" means that these houses are constructed on lands designated for agricultural purpose by the second plan or on State owned land and having no construction permits.

Housing projects in Dunmar (Zone 14), agricultural lands left in Kafer Sussah (Zone 23), Lowan (Zone 24) and Bab Sharqi (Zone 47) are considered to be the only lands available for the future urbanization in Damascus City (see Figure 3.9.2).

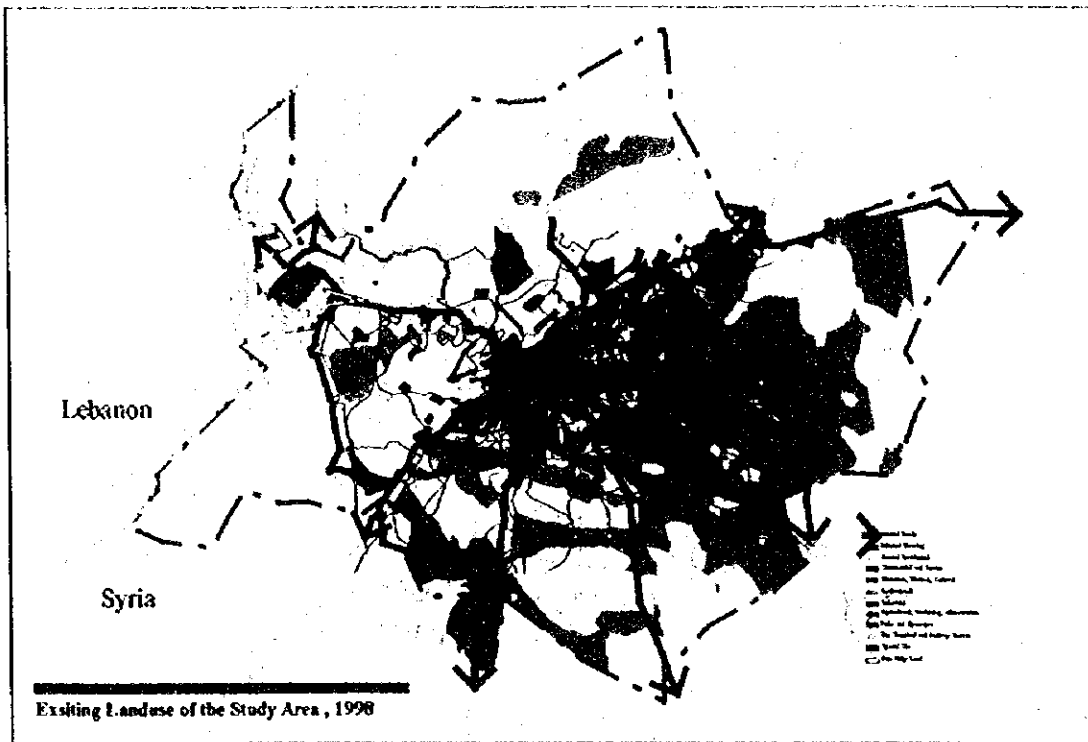


Figure 3.9.1 Existing Land Use in Study Area (1998)

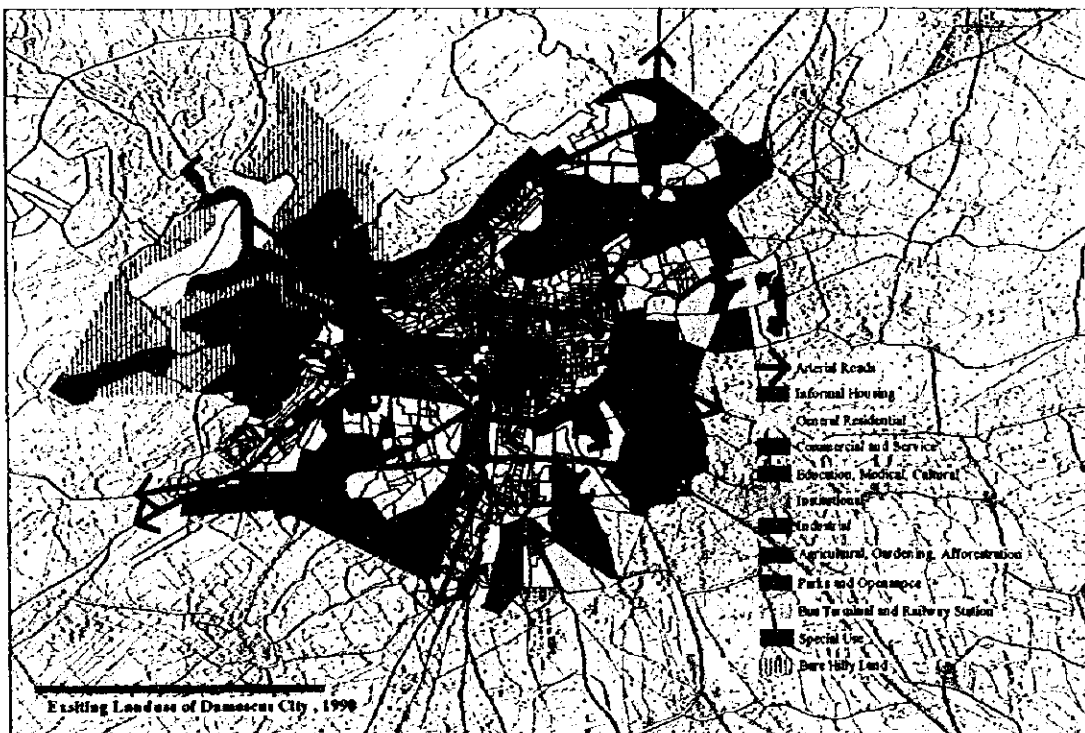


Figure 3.9.2 Existing Land Use in Damascus City (1998)



# Chapter 4. CHARACTERISTICS OF PERSON TRIP SURVEY

## 4.1 Overview of Home Interview Survey and Related Surveys

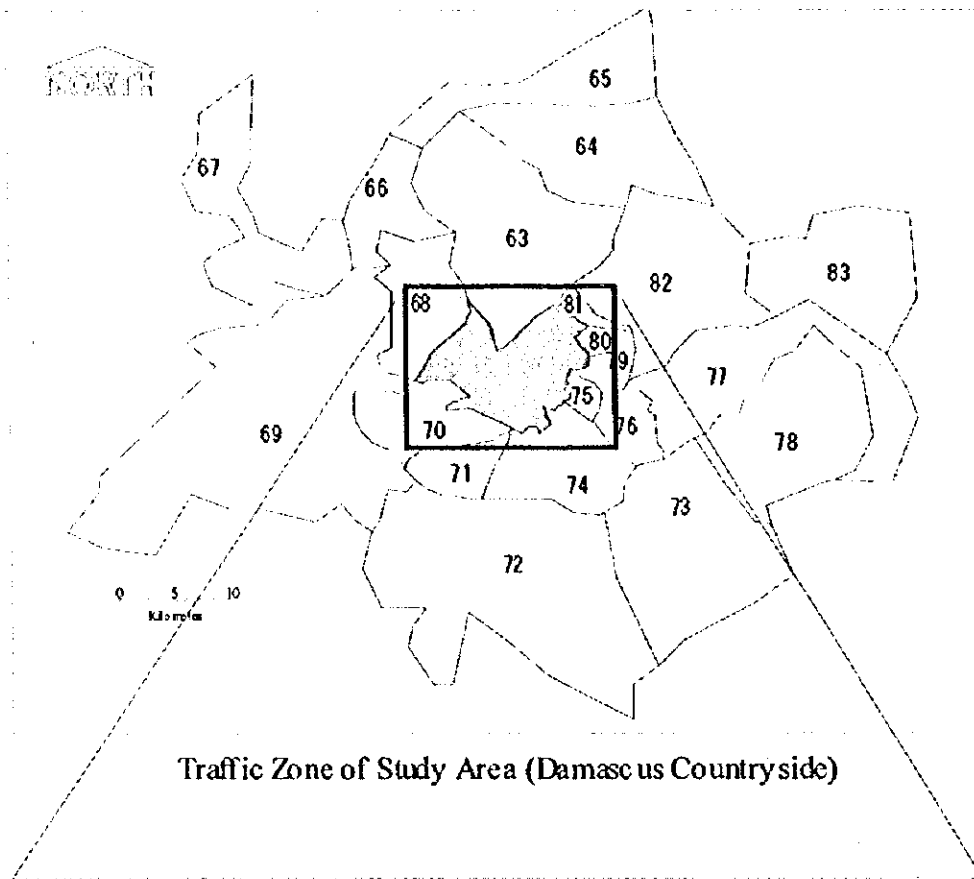
### 4.1.1 Home Interview Survey

Home interview survey was carried out to collect information on person trip activities by direct questioning method. Based on the 1994 Census information by traffic zone shown in Figure 4.1.1, 18,000 households were selected at random. The census shows that there were 494,657 households in the study area. The rate of extraction resulted in 3.6%. Survey items are listed in Table 4.1.1. They cover household attributes, personal attributes for each member and descriptions of trips made by each member. As for transport modes, eight modes system is adopted as follows;

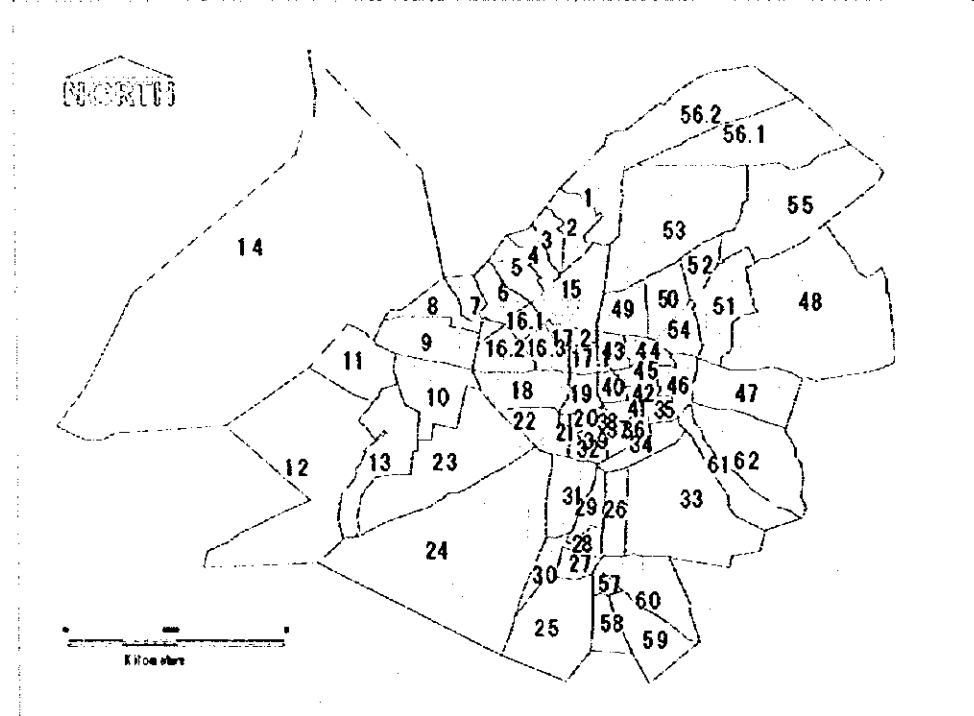
1. Walking
2. Bicycle and Motorecycle,
3. Passenger Car,
4. Taxi,
5. Microbus,
6. Bus,
7. Truck, and
8. Others.

**Table 4.1.1 Home Interview Survey Items**

Survey Item	
Household Attributes	Passenger Car Ownership Other Four Wheels Vehicle Ownership Two Wheelers Ownership Number of Constituents of Household Household Income in one Month Parking Facility in Residence Owned Car Information
Personal Attributes for Each Member	Gender Age Occupation Profession Driving License Holding Place of Job Number of Trips on the Day covered by the Interview
Trip Descriptions	Origin Destination Trip Purpose Number of Transport Modes used
Transport Mode	Origin Destination Transport Mode Time of Start Time of Arrival Travel Time Parking Condition (in case of passenger car use) Number of Passengers (in case of passenger car use)



Traffic Zone of Study Area (Damascus Countryside)



Traffic Zone of Planning Area (Damascus Governorate Area)

Figure 4.1.1 Zones of Survey Area

### 4.1.2 Cordon Line Survey

The cordon line survey was carried out to clarify traffic coming into or going out of the Study area (see Figure 4.1.2). Ten points where roads cross the study area boundary were set as survey points for the cordon line survey. Main work of the survey was to stop a car and interview the driver (in case of passenger car) and passengers (in case of bus). The interview survey started at 6:00 AM and ended at 10:00 PM (16 hours duration) with a sampling rate at least 10%. In order to expand the results of these interviews to cover all trips passing through the survey points, traffic counting was carried out for duration of 24 hours.

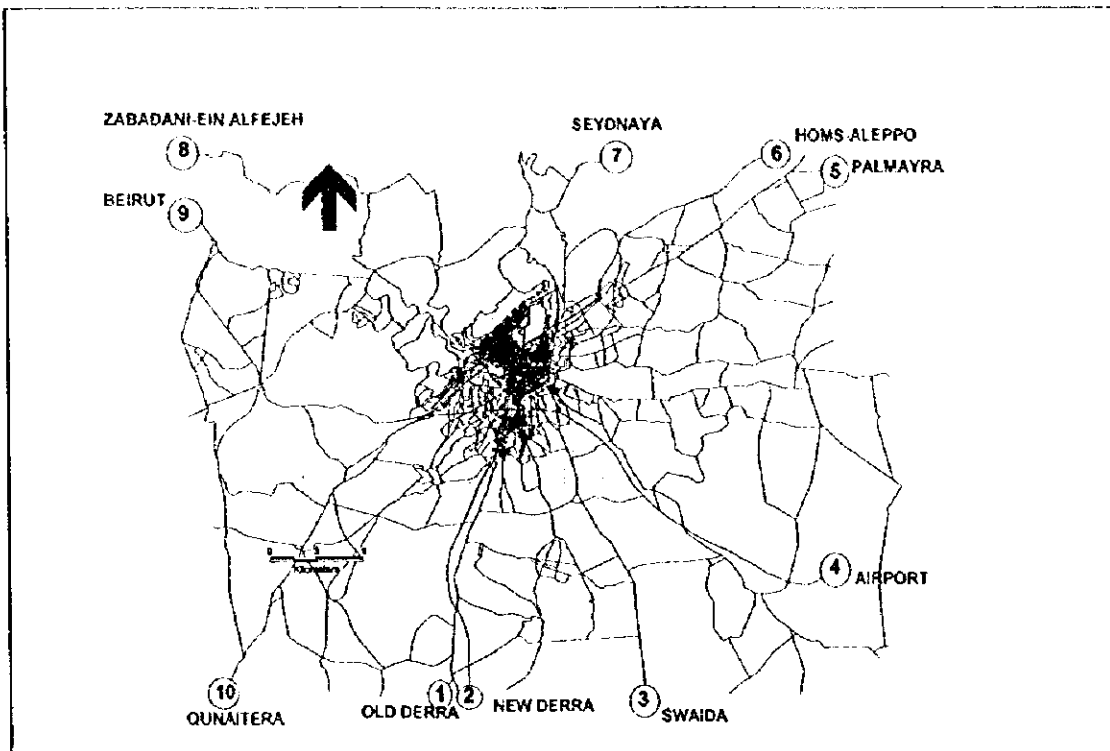
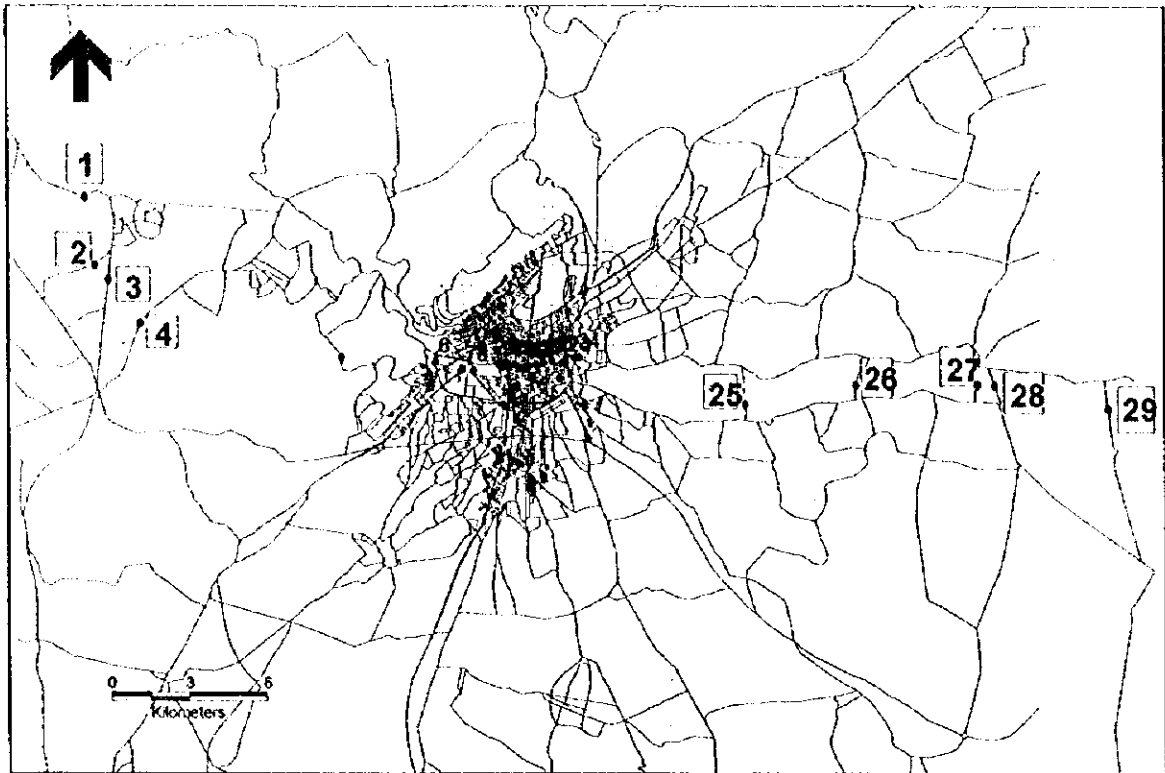


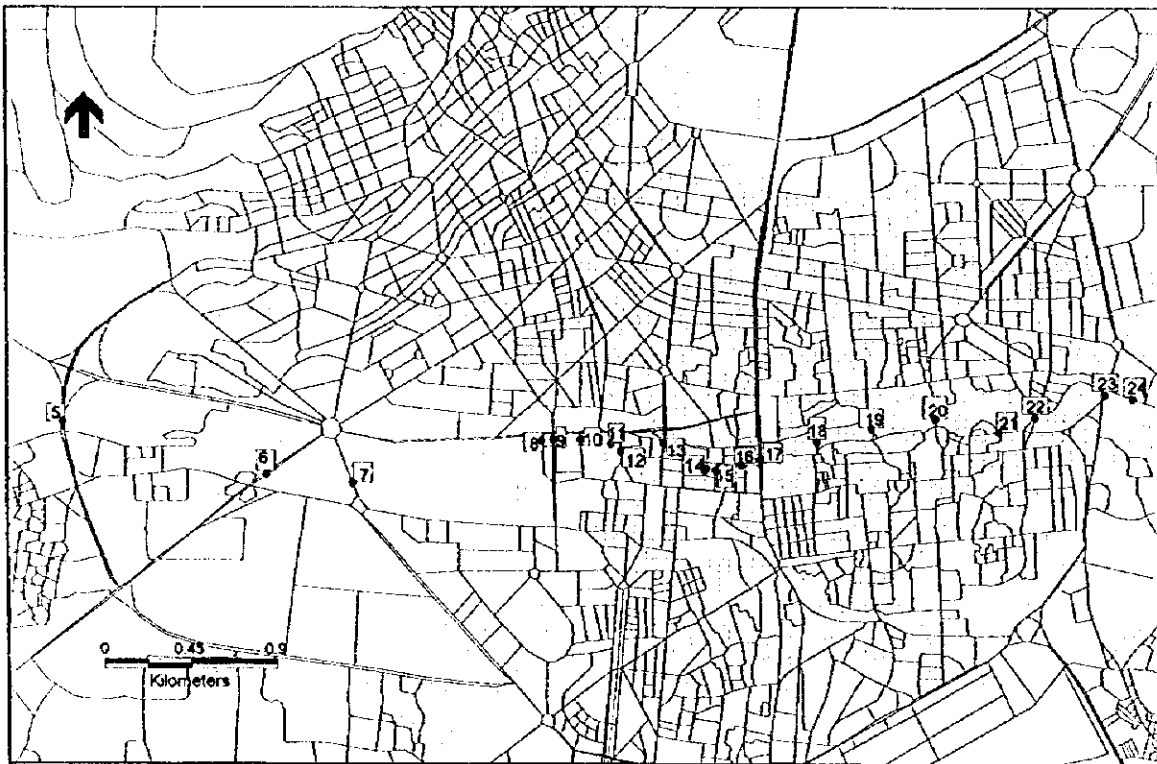
Figure 4.1.2 Survey Points of Cordon Line Survey

### 4.1.3 Screen Line survey

Screen line is the imaginary line that divides the study area in two. The traffic crossing the screen line is counted and used for calibration of OD (Origin and Destination) tables. Barada River was considered as the screen line and traffic count was done at 29 survey points. Twenty-four hour traffic counts were done at survey points within Damascus city, totaling 17 points (No. 6 to No. 22) and 16 hour traffic counts at the remaining 12 survey points outside the city (No. 1 to No. 5 and No. 23 to No. 29). All trips crossing the screen line during the survey period were counted by trip mode (seven modes) and by direction. Survey points are shown in Figure 4.1.3 and Figure 4.1.4.



**Figure 4.1.3 Survey Points of Screen Line Survey (Outside Damascus City)**



**Figure 4.1.4 Survey Points of Screen Line Survey (Damascus City)**

## 4.2 Summary of Trip

### 4.2.1 Number of Trips

#### (1) Total Number of Trips

The number of trips per day in 1998 made in, in-out, out-in and through the Study Area was 4,223,236, of which 3,953,543 trips were closed inside of the Study Area. Due to this, the Study Area is regarded to be almost closed in terms of passenger transportation (Figure 4.2.1).

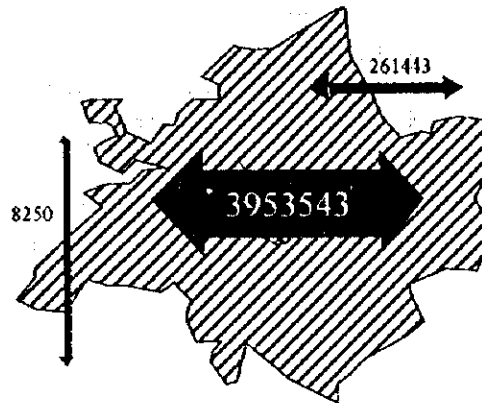


Figure 4.2.1 Total Number of Trips

#### (2) Trip composition by Purpose

As shown in Figure 4.2.2, the major purposes of trips were “to home” (49%), to work” (21%), and “to school” (11%). These three purposes, which combine to make up 81% of all trips, are trips that take place daily and account for a large proportion of trips made during the peak hour.

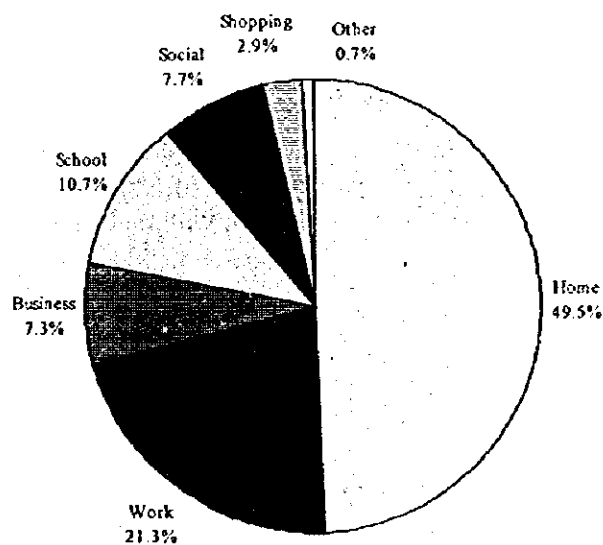


Figure 4.2.2 Trip composition by Purpose

### (3) Trip composition by Mode

The composition of trips by mode is shown in Figure 4.2.3. The figure, Modal Share, reveals that microbuses accounted for the largest number of trips at 32.6%, followed by walk at 28.8%, private cars at 15.0%, and taxis at 12.6%. When considering the number of trips excluding walking and bicycles, which place only a minimal load on transportation facilities, microbus accounted for 46.8%, public cars 21.5%, taxis 18.1%, and buses (private buses) 11.2%.

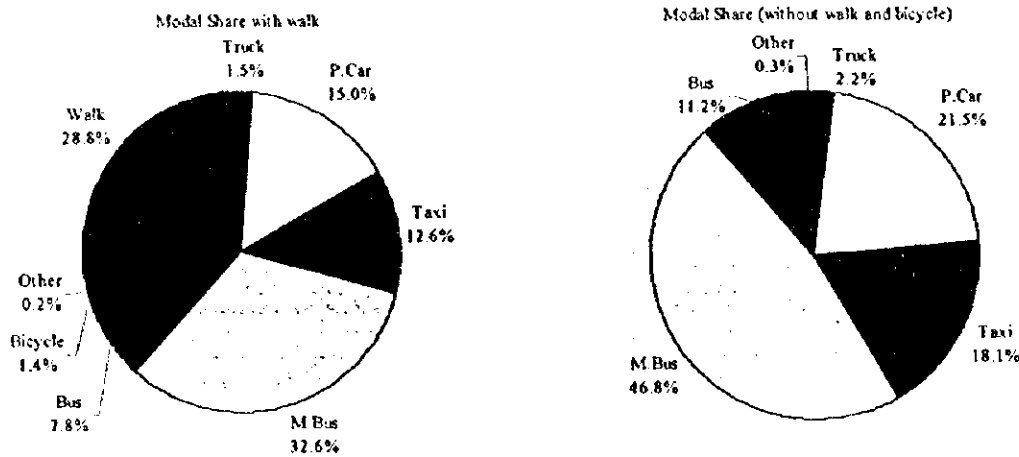


Figure 4.2.3 Modal Share

### 4.2.2 Trip Production Unit

There are two types of trip production unit: gross and net. While the gross unit is the number of trips per population aged more than six, the net unit is the number of trips per trip makers, excluding persons who do not go out. Unless otherwise indicated, this report uses the gross unit as the trip production unit. The trip production unit in the Damascus study area is 1.58 (gross) and 2.44 (net), and out-going ratio (the rate at which people go out for various purposes) is 65%.

#### (1) Trip production by Age, Sex and Purpose

The trip production unit is 1.80 for males and 0.97 for females, showing a substantial gap of gross production unit depending on gender. These figures come from the reluctance felt by females to go outside, reflecting a typical phenomenon in Arab countries. Such a tendency can be seen more clearly in Figure 4.2.4 and Figure 4.2.5, which shows trips by age and purpose.

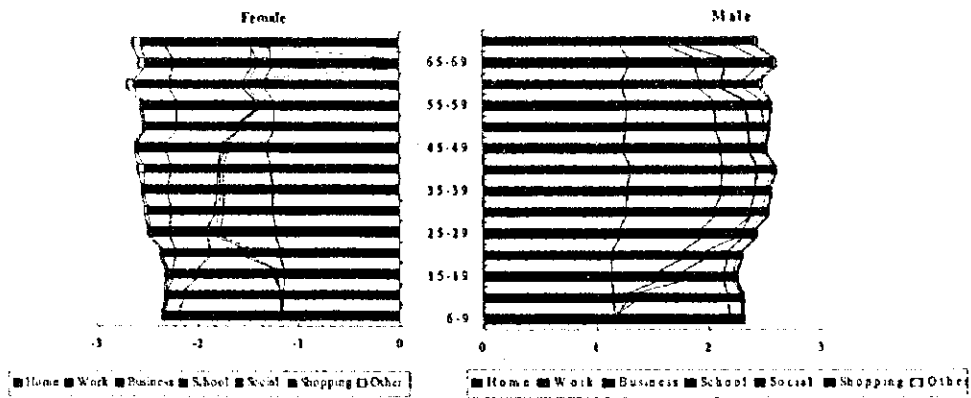


Figure 4.2.4 Trip by Age rank, Sex and Purpose (net)

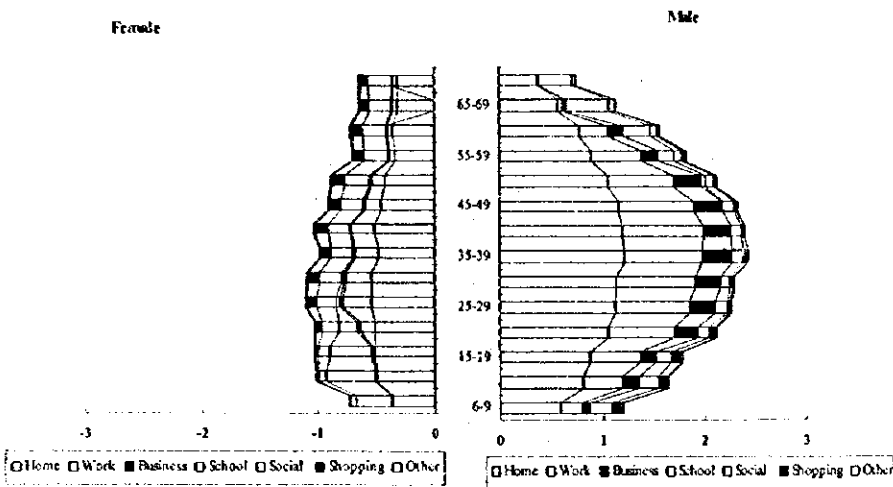


Figure 4.2.5 Trip by Age rank, Sex and Purpose (gross)

## (2) Trip Production by Industry and Purpose

The trip production unit is the highest for those in the transport/communication industry (2.6), as can be seen in Figure 4.2.6. The figure is the lowest among those engaged in agriculture at 2.0, and trip production units among workers in all other industries distribute in the range of those.

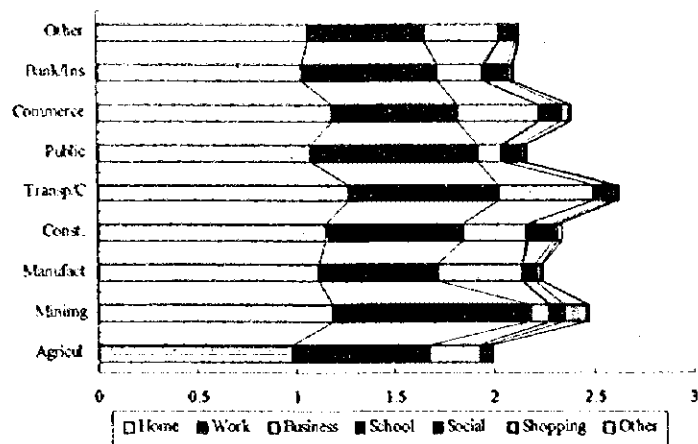


Figure 4.2.6 Trip Production Rate by Industry and Purpose

### (3) Trip Production by Income and Purpose

The trip production unit is clearly the highest for households with high income levels (Figure 4.2.7). In terms of purpose, the higher the income, the greater the rate for “to work” and “business”.

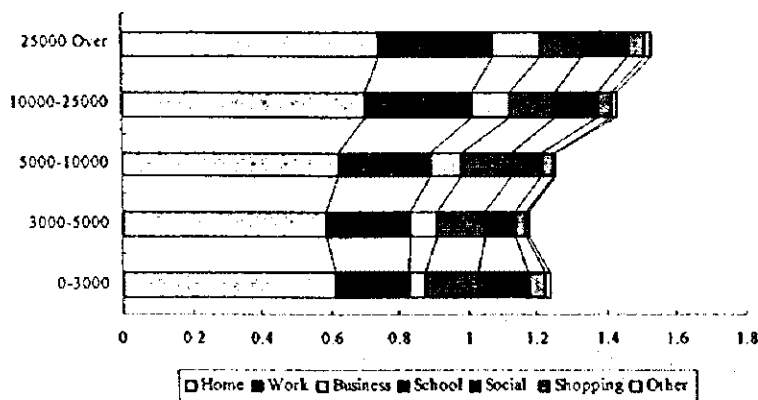
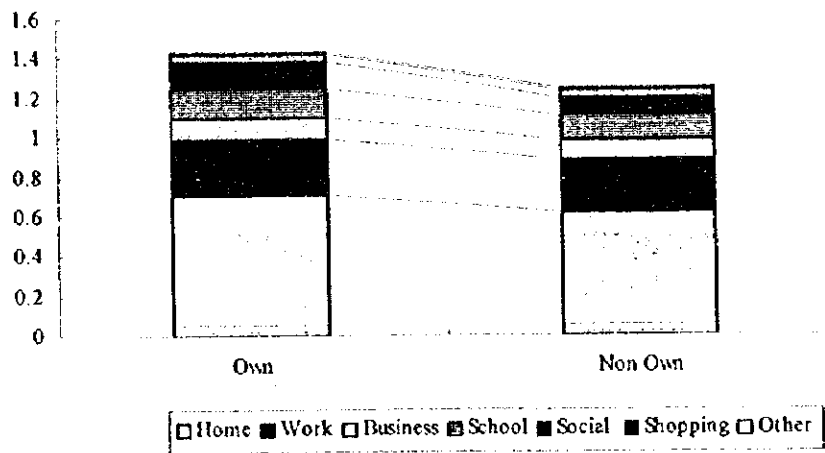


Figure 4.2.7 Trip Production Rate by Income and Purpose

### (4) Trip Production by Car Ownership and Purpose

The trip production unit for households that own cars is 1.4, while that for non-car owning households is 1.2 (Figure 4.2.8). This fact shows that the ownership of a car has some influence on the likelihood of going out.

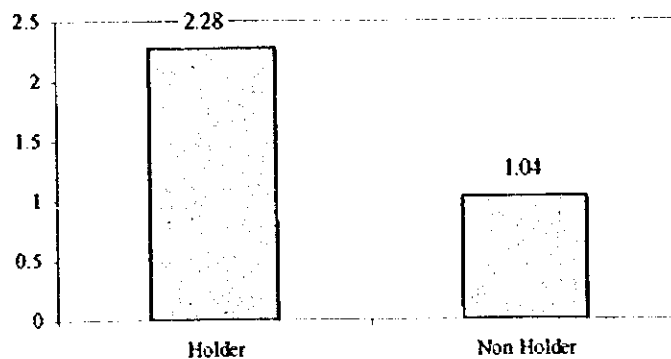




**Figure 4.2.8 Trip Production Rate by Car Ownership**

### (5) Trip Production by Driving License Holding and Purpose

The trip production unit for driver license holders is 2.28, while that for non-holders is 1.04 (Figure 4.2.9). This fact shows the driver license holder group is composed of rather trip active persons.



**Figure 4.2.9 Trip Production Rate by Driving License Holding**

## 4.3 Trip Generation and Attraction

### 4.3.1 Generation/Attraction by Zone and Purpose

Figure 4.3.1 shows the integrated zoning system of Damascus City and Table 4.3.1 summarizes the volumes and rates of trip generation and attraction by purpose in each integrated zone. Figure 4.3.2 gives the composition of trips generated and attracted by zone by To Work purpose.

A large volume of trips is generated in zones such as Muhjreen, Al Zahira and Al Mukhayyam which are dominantly residential areas, and highly attraction ratio to generation is seen in zones Baramkeh, Al Hijaz and Old City, which are central business districts. Trip generation and attraction for each purpose are described below.

### (1) To Work

Trips made for the purpose of commuting to work are generated in large volumes from residential areas since this occurrence correlates with the size of the population. The volume of attraction is high in employment areas (business districts, industrial districts). The generation/attraction ratio (trip generation volume divided by trip attraction volume) is relatively high in residential areas such as South and North, indicating that the volume of trips generated is larger than the volume of trips attracted. Conversely, business districts such as zones Al Malki, Al Hijaz, Baramkeh, Sweka and Old City have a higher volume of attraction than generation.

### (2) To School

The volume of trips generated for the purpose of commuting to school correlates to the size of the population, as with the purpose of "To Work". It is generally considered that primary and junior high school students commute to school within the zone they live, and since the number of primary school students is relatively large, the volume of attraction almost equals the volume of generation in a given zone. But in Damascus, commuting to school crossing zones is often seen. Generation/Attraction ratio is extremely low in zones Old Mezzeh, New Mezzeh, Al Malki, Al Hijaz, Baramkeh, Old City and Fares Al Khouri, and high in zones Muhajireen, Dummar, Kafar Susseh, Al Wahda and Al Mukharyyam.

### (3) Others

Other trip is consisted mainly of Business, Shopping and Social Activities. Ratios of Generation/Attraction are close to 1.0. It means these activities are accomplished within the zone generated.

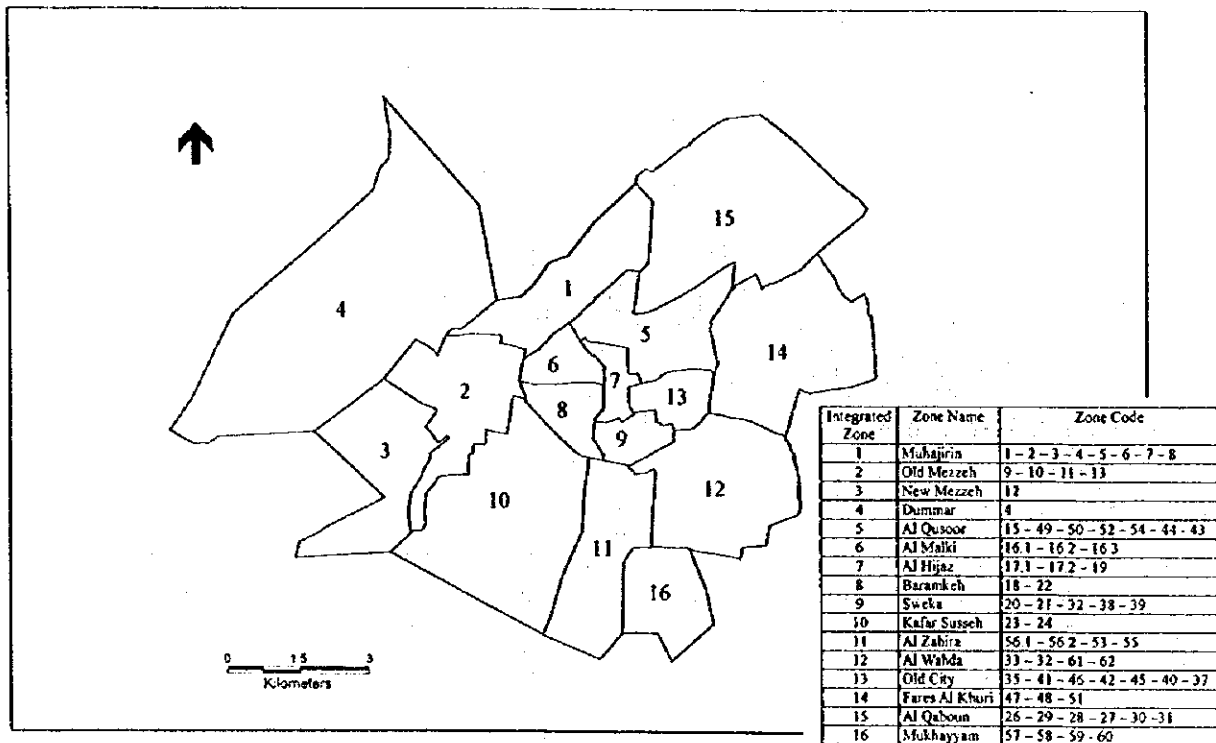
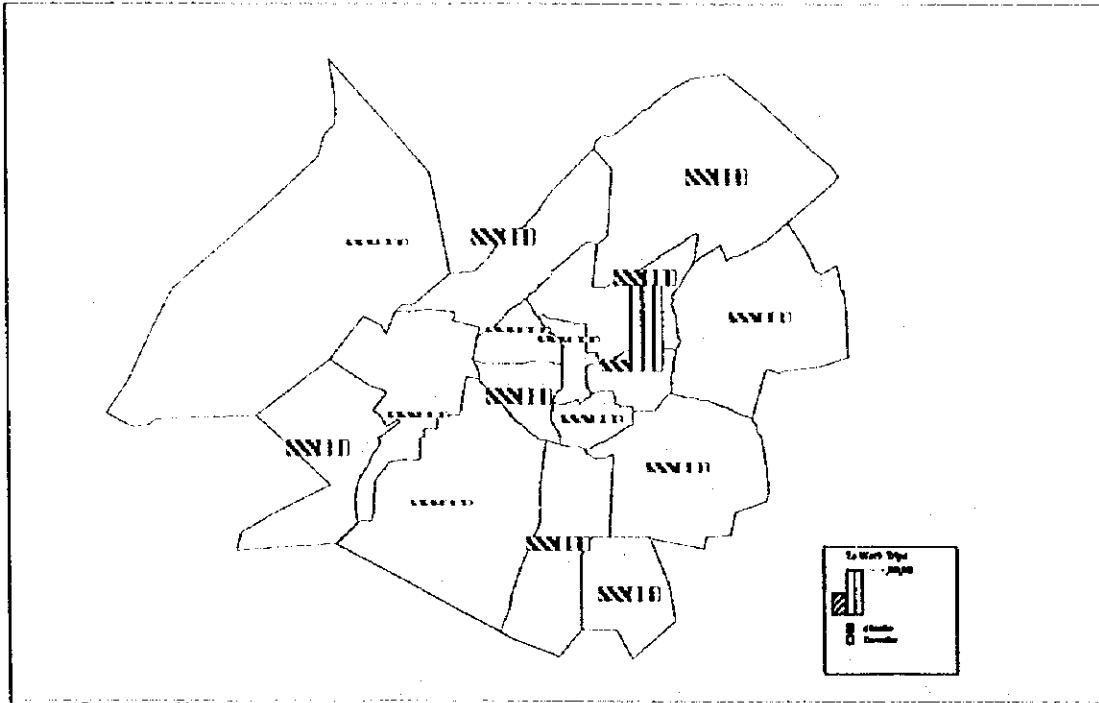


Figure 4.3.1 Integrated zoning system of Damascus City

**Table 4.3.1 Trip Generation and Attraction by Zone and Purpose (1998)**

Zone No.	Zone Name	Work	School	Others	To Home	Total
<b>Generation</b>						
1	Muhajirin	61,192	21,888	37,995	104,539	233,585
2	Old Mazzeh	11,948	2,667	4,951	37,124	67,612
3	New Mazzeh	36,829	11,911	14,579	119,145	217,680
4	Dummar	15,038	6,641	6,224	25,125	77,285
5	Al Qusoor	29,838	9,698	30,230	113,156	193,581
6	Al Malki	7,283	2,471	11,715	69,774	88,380
7	Al Hijaz	4,996	113	8,653	55,989	71,519
8	Baramkeh	16,988	1,487	9,355	150,775	190,059
9	Sweka	17,077	3,512	18,879	59,863	96,818
10	Kafar Susseh	29,989	6,675	13,358	32,749	95,057
11	Al Zahira	61,852	15,756	54,892	107,404	226,433
12	Al Wahda	39,397	21,647	30,313	40,118	126,274
13	Old City	11,159	724	20,084	122,185	149,609
14	Fares Al Khuri	25,888	744	26,813	55,949	114,513
15	Al Qaboun	46,790	16,920	45,864	93,426	225,452
16	Mukhayyam	61,177	32,950	76,261	75,771	203,166
<b>Attraction</b>						
1	Muhajirin	41,792	13,137	38,905	122,464	233,287
2	Old Mazzeh	17,610	7,259	4,808	28,398	69,171
3	New Mazzeh	46,378	38,943	14,750	93,048	218,976
4	Dummar	8,714	4,118	6,331	51,937	77,410
5	Al Qusoor	48,032	12,060	27,030	68,219	185,010
6	Al Malki	30,938	9,210	11,668	15,787	90,477
7	Al Hijaz	27,671	4,974	8,365	12,791	72,502
8	Baramkeh	79,460	40,283	9,263	28,844	189,813
9	Sweka	31,327	6,307	18,607	31,624	96,648
10	Kafar Susseh	18,015	2,502	13,431	60,971	94,968
11	Al Zahira	38,592	24,502	55,243	114,837	225,008
12	Al Wahda	15,381	10,667	30,559	83,816	126,119
13	Old City	50,028	15,522	22,928	31,362	158,787
14	Fares Al Khuri	27,475	6,233	26,679	56,647	115,211
15	Al Qaboun	46,807	12,823	45,820	124,932	227,009
16	Mukhayyam	30,442	17,704	76,201	125,172	204,825
<b>Generation/Attraction</b>						
1	Muhajirin	1.46	1.67	0.98	0.85	1.00
2	Old Mazzeh	0.68	0.37	1.03	1.31	0.98
3	New Mazzeh	0.79	0.31	0.99	1.28	0.99
4	Dummar	1.73	1.61	0.98	0.48	1.00
5	Al Qusoor	0.62	0.80	1.12	1.66	1.05
6	Al Malki	0.24	0.27	1.00	4.42	0.98
7	Al Hijaz	0.18	0.02	1.03	4.38	0.99
8	Baramkeh	0.21	0.04	1.01	5.23	1.00
9	Sweka	0.55	0.56	1.01	1.89	1.00
10	Kafar Susseh	1.66	2.67	0.99	0.54	1.00
11	Al Zahira	1.60	0.64	0.99	0.94	1.01
12	Al Wahda	2.56	2.03	0.99	0.48	1.00
13	Old City	0.22	0.05	0.88	3.90	0.94
14	Fares Al Khuri	0.94	0.12	1.01	0.99	0.99
15	Al Qaboun	1.00	1.32	1.00	0.75	0.99
16	Mukhayyam	2.01	1.86	1.00	0.61	0.99



**Figure 4.3.2 Composition of Trips Generation and Attracted (To Work)**

### **4.3.2 Trip Generation by Time**

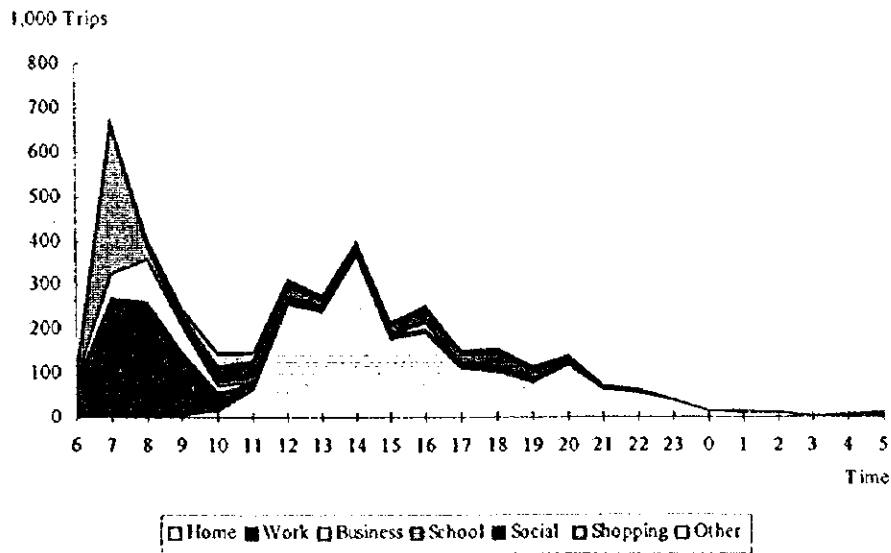
#### **(1) Trip Generation by Time and Purpose**

Figure 4.3.3 shows the volume of generation according to the time of generation and purpose. According to this figure, trip generation peaks between 7:00 and 8:00 (plotted at 7:00) in the morning (roughly 670,000 trips; peak ratio 16.7%) for the purpose of “to work” and “to school”. Thereafter, there is a steady flow of traffic spread out evenly between 9:00 and 21:00, with peaks occurring from 12:00 to 13:00 and from 14:00 to 15:00.

In terms of purpose, the generation of “to work” trips peaks between 7:00 and 9:00, and the majority of such trips is completed before 10:00. Trip generation for “to school” peaks between 7:00 and 8:00.

The volume of trips generated for “business” purposes peaks between 7:00 and 9:00. The reason why “business” trips generate so early is many independent workers are going to client’s offices to do work there.

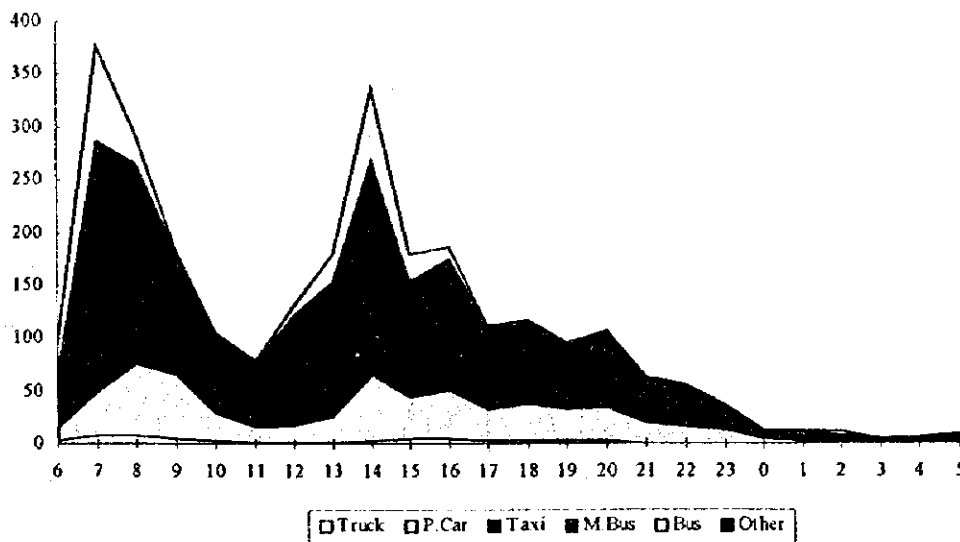
Trip generation for “to home” starts from 10:00 and gently spreads with a peak 14:00 to 15:00.



**Figure 4.3.3 Trip Generation by Time and Purpose**

Figure 4.3.4 shows the volume of trip generation by time and mode, excluding walking and two wheelers. This differs from the pattern for all modes of transport shown in Figure 4.3.4 in that a peak occurs twice: from 7:00 to 8:00 and from 14:00 to 15:00. This characteristic may be attributed to the fact that the exclusion of walking and two wheelers, which are usually used for relatively short distances. The remaining volume is accounted for mainly by those commuting to work and returning home from work. These two purposes account for the two peaks in the day.

The modal shares remain about the same at all times except microbus and bus (work bus). During the two peaks, the share of both modes increase.



**Figure 4.3.4 Generation by Time and Mode**

## 4.4 Trip Distribution

### 4.4.1 Trips of All Purposes and All Modes

The distribution of trips (made by residents only) in terms of all purposes and all modes of transport for integrated zones is compiled in an OD table, Table 4.4.1. Figure 4.4.1 shows trips as a desire line.

Of the total number of trips made by residents (4,224 thousand trips), those which originated and ended in the same integrated zone (intra-zonal trip) represent 38.8 %.

A characteristic of the overall trip distribution is rather scattered. Relatively a large flow of traffic starting from and returning from zone 1 (populated area). There are large flows of South to North (connecting zones 1-8-11-16 and 1-5-13) and West to East (connecting zones 15-1-6-3).

Figure 4.4.2 and Figure 4.4.3 show the desire line of “to work” and “to school” traffic within the integrated zones.

### 4.4.2 “To Work” and “To School” Trips

The OD Table of “To Work” trips is shown in Table 4.4.2. And the desire line drew using this table is shown as Figure 4.4.2.

The pattern of Figure 4.4.2 is observed as is quite similar to Figure 4.4.1, which is natural because “To Work” flow and “To Home” flow caused by Work count 44.2 % of total trips.

Figure 4.4.3 and Table 4.4.3 show that inter-zonal trips made by students concentrate in zones in central part of the city.

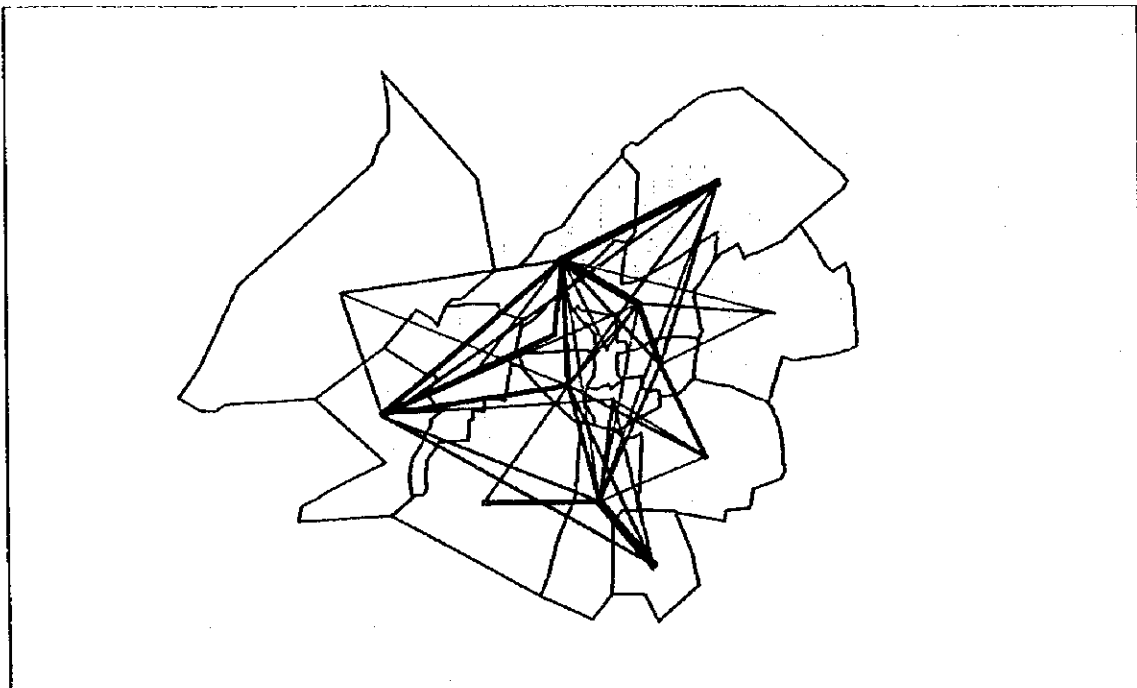


Figure 4.4.1 Present Desired Line (All Purpose – All Mode)

**Table 4.4.1 OD Table from Home Interview Survey (Trip Base, All Purpose, All Mode)**

Zone	1	2	3	4	5	6	7	8	9	10	11	12
1	57523	6377	13512	7869	18914	12887	6318	13829	3214	3313	6625	4018
2	6437	6278	13325	2922	3048	2052	485	3776	1574	1534	2947	1857
3	13564	13727	41559	4951	6581	13586	4944	12701	4078	4484	8174	4544
4	7809	2957	4668	13314	4795	3741	1732	6257	1120	1001	1855	824
5	20138	2981	6772	4495	35049	6834	5745	7174	3134	2003	5146	4451
6	12776	2134	13108	4154	6605	9833	2211	4602	1164	1268	4260	1928
7	6093	484	4941	1988	5380	2311	6404	3618	1379	914	4138	3063
8	13385	3973	12556	5703	6988	4968	4023	8642	3997	5795	10606	7606
9	3064	1579	4091	1341	3236	1064	1385	3796	15929	3313	8957	5691
10	3476	1661	4699	812	1817	1265	939	5776	3342	26124	12900	886
11	6654	2979	8388	1811	5335	4443	4205	10931	8239	12932	72375	5412
12	4094	1776	4696	815	4350	1870	2915	7649	5589	947	5472	35137
13	9504	1782	6862	3899	13358	1224	1481	2430	4564	3251	7701	12759
14	5358	845	3275	835	7377	1913	1243	2452	999	1859	2795	4697
15	20053	2246	8693	2369	13364	4372	4272	7446	2019	2981	6156	3442
16	4401	1676	8776	3110	3559	1976	3947	9431	5165	3586	23243	2149
17	3907	196	2757	234	4259	763	2217	3053	832	349	772	1107
18	4655	2302	4048	6908	3804	3645	1636	4453	2119	1180	2237	1028
19	8035	3613	21443	3077	5605	2539	3550	22988	6161	8308	12595	2994
20	9027	3465	13692	2142	10806	3136	6482	25078	11727	5483	14701	15960
21	7333	3384	7663	2383	11961	2304	2386	8251	1480	1705	3529	3373
22	36	0	616	151	98	0	0	196	139	128	164	91
23	5965	2756	8836	2127	8721	3751	3982	15284	8684	2510	7660	3102
Total	233287	69171	218976	77410	185010	90477	72502	189813	96648	94968	225008	126119

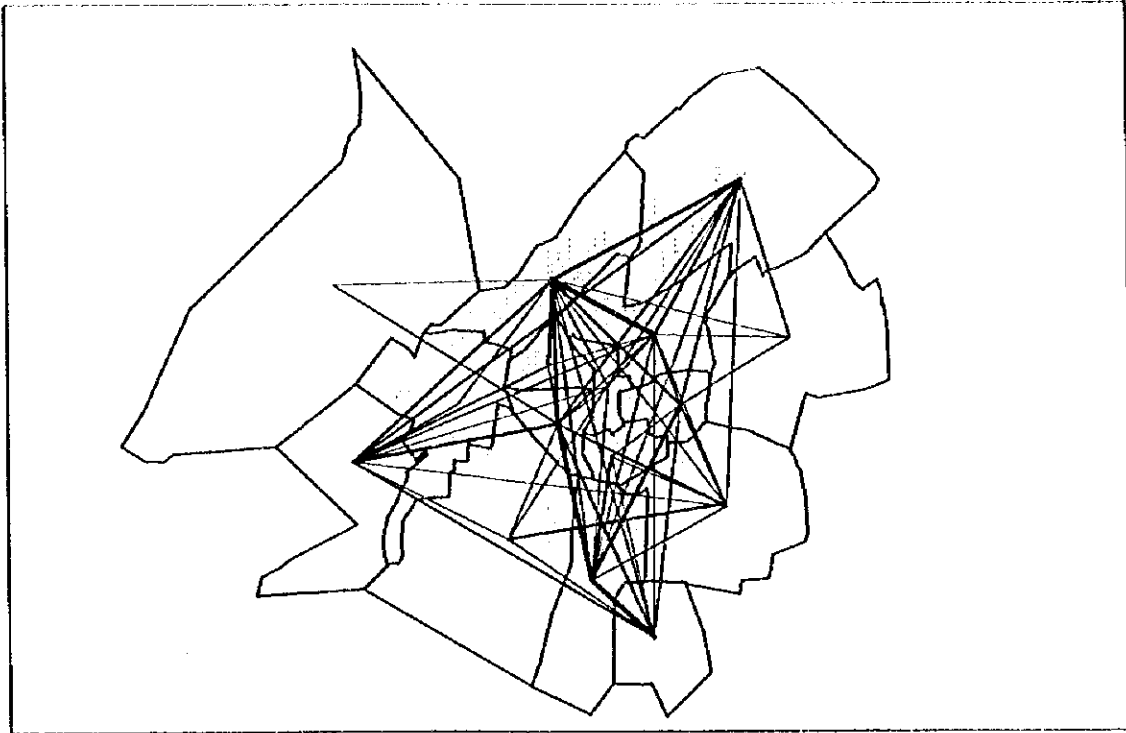
Zone	13	14	15	16	17	18	19	20	21	22	23	Total
1	9739	5430	20074	4250	3686	4560	8837	9234	6928	36	6412	154399
2	1857	865	2218	1695	175	2227	3728	3006	3382	0	2224	46235
3	6404	3559	8551	8744	2756	3563	21807	14180	7266	617	7340	132893
4	3211	629	2353	3113	233	6887	3381	2159	2243	151	2852	50073
5	20450	7422	13379	3738	4141	4116	5680	10608	11937	98	8090	103922
6	1930	1763	4323	1931	763	3793	2475	3041	2353	0	1965	64043
7	1579	1393	4385	4308	2225	1431	3230	6343	2393	0	3519	40713
8	2901	2415	7369	9295	2760	4474	23558	25022	8384	196	15443	88242
9	4762	961	2215	5294	831	2290	5655	11673	1391	139	8161	53446
10	3311	1915	2998	3427	447	1110	8376	5385	1674	124	2593	63697
11	7583	2974	6346	23475	768	2707	13095	14211	3537	164	7869	143704
12	12785	4582	3629	2105	1049	1102	3161	15955	3164	91	3341	75310
13	12746	5716	8659	4727	4955	2305	8170	26639	3924	0	2953	68815
14	5888	34689	4816	2528	1238	665	3200	17112	7426	85	3218	33648
15	8501	4860	79819	3059	6528	3403	4370	9702	16807	1139	9851	77413
16	4918	2515	3120	86775	974	1441	8133	17208	3246	109	3708	71019
17	4748	1217	6598	931	62733	255	914	2502	2558	0	3146	20446
18	2084	615	3339	1531	328	32288	1989	2678	2042	0	2607	38015
19	8272	2952	4338	8027	914	2077	377290	14252	3754	96	9796	100908
20	26404	16690	9342	16755	2476	2766	13910	368505	13228	737	11882	121699
21	4073	7781	16514	3201	2734	2043	3898	13236	236190	1834	6298	55752
22	0	85	1040	133	0	0	194	737	1925	9867	1220	1619
23	4641	4183	11584	5783	2186	3060	11215	11896	8038	991	8250	73378
Total	158787	115211	227009	204825	104900	88563	536266	605284	353790	16474	132738	1679389

Table 4.4.2 OD Table from Home Interview Survey (Trip Base, Work Purpose, All Mode)

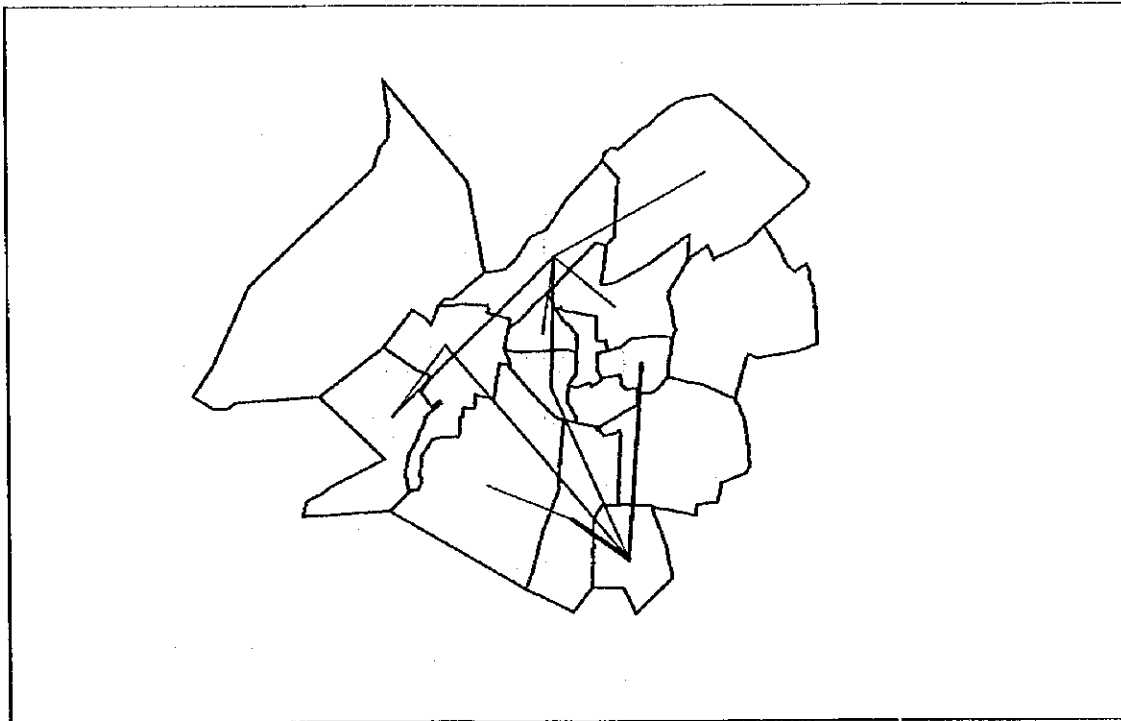
Zone	1	2	3	4	5	6	7	8	9	10	11	12
1	10758	1576	3176	585	5982	5621	3013	5907	1090	917	1686	266
2	1079	1609	1268	342	738	695	91	1302	477	115	486	304
3	1669	2186	5197	671	1334	3144	1907	5250	928	808	949	28
4	1451	533	1246	643	798	319	553	2894	288	314	291	119
5	2504	580	1602	509	5512	2143	1795	1958	633	235	605	304
6	529	227	459	177	538	1518	864	1139	160	96	143	19
7	415	30	205	0	708	334	918	1149	86	0	100	227
8	555	128	545	24	469	1087	889	2004	1058	361	385	41
9	394	125	595	148	941	338	906	1117	2454	205	852	287
10	897	647	1564	173	529	816	536	2357	1384	5575	3369	213
11	1972	1240	2777	324	1929	2742	2353	6432	3954	1780	12153	1043
12	1813	563	1376	295	2174	987	1042	4677	1807	541	1875	6353
13	628	77	419	41	1444	552	659	793	254	133	131	423
14	1325	239	1072	137	1841	590	730	1043	115	252	143	272
15	3239	890	2941	725	3066	1282	1615	3245	592	609	689	195
16	2154	748	3797	1065	1843	988	1535	4374	2228	1499	4920	414
17	1248	0	550	0	1736	549	735	896	310	145	0	0
18	238	162	323	410	262	655	303	689	300	162	0	86
19	2226	1906	7120	524	2755	1821	1594	9094	1661	1587	3042	642
20	3380	1256	4655	573	4686	1812	2686	11461	6115	1527	3184	2735
21	1910	2066	2028	849	6067	1894	1719	4858	674	563	1104	688
22	0	0	294	0	98	0	0	0	98	0	112	0
23	1408	822	3169	499	2582	1051	1228	6821	4661	591	2373	722
Total	41792	17610	46378	8714	48032	30938	27671	79460	31327	18015	38592	15381

Zone	13	14	15	16	17	18	19	20	21	22	23	Total
1	3981	1151	3287	666	254	1480	1696	2629	3352	36	2083	40577
2	745	148	305	365	49	123	566	642	84	0	415	8506
3	1857	539	878	475	152	553	3273	1865	1532	0	1634	24071
4	558	174	709	260	0	1374	440	770	526	151	627	9449
5	2712	782	1496	449	120	53	407	1437	1184	0	2818	18380
6	290	38	186	158	70	0	0	168	107	0	397	5869
7	106	126	0	0	25	0	0	85	113	0	369	4172
8	833	425	233	298	23	23	882	375	190	0	6160	7546
9	1892	240	364	306	84	18	617	872	372	41	3909	8362
10	1519	539	1650	669	60	338	2780	1970	948	26	1430	18060
11	5486	1537	1564	3520	171	412	3051	3073	1340	52	2947	38699
12	3659	1082	2042	466	292	452	1360	4017	1235	91	1198	23503
13	2270	359	507	140	66	21	242	1009	458	0	533	5554
14	2609	8149	1299	188	231	198	427	1813	1994	85	1136	7759
15	1983	931	11714	76	669	812	919	1824	4593	613	3568	19088
16	2666	1262	1762	14783	345	1018	4460	4948	2524	109	1735	25565
17	1285	454	1846	0	18301	83	166	716	1110	0	1656	6169
18	76	172	587	67	0	2183	430	258	401	0	690	3590
19	3066	1192	1597	1288	581	1003	52480	5913	2053	96	5019	33972
20	8564	3947	3064	4561	505	1452	3741	56850	6036	443	4410	44070
21	2036	2439	7227	351	401	826	1208	3326	64897	517	2895	24420
22	0	0	0	0	0	0	98	98	434	1662	816	602
23	1835	1789	4490	1356	808	1020	2656	4308	3650	495	3408	25927
Total	50028	27475	46807	30442	23207	13442	81899	98966	99133	4417	49853	403910





**Figure 4.4.2 Present Desire Line (Work Purpose, All Mode)**



**Figure 4.4.3 Present Desire Line (School Purpose, All Mode)**

Table 4.4.3 OD Table from Home Interview Survey (Trip Base, To School, All Mode)

Zone	1	2	3	4	5	6	7	8	9	10	11	12
1	7225	957	3147	85	1775	1969	346	3556	113	20	22	295
2	184	415	800	0	0	88	26	864	26	29	0	77
3	180	920	6077	161	407	297	381	1764	28	114	21	280
4	320	927	777	1440	38	901	76	1327	0	76	0	343
5	685	130	1163	58	3526	883	161	1329	0	0	0	78
6	217	100	606	43	102	512	37	568	0	0	0	76
7	0	0	25	0	0	0	0	0	0	39	0	0
8	62	23	220	0	0	93	42	125	0	0	92	0
9	19	19	132	19	111	43	44	269	2304	30	215	100
10	131	26	347	0	90	0	92	833	559	1616	2491	0
11	336	120	1301	0	107	383	382	1280	314	169	10081	112
12	163	620	1633	0	496	263	397	1701	973	57	1007	6451
13	26	0	186	0	193	0	79	21	0	0	0	21
14	53	57	272	0	29	0	0	94	0	0	22	0
15	1232	92	1620	31	1136	570	143	1642	61	0	18	152
16	167	48	2929	70	292	552	678	2611	806	0	7645	93
17	218	0	1377	88	322	144	218	1843	0	0	0	362
18	1112	734	540	1868	507	1533	464	1057	76	76	0	76
19	417	505	6972	168	84	274	168	7071	510	0	959	435
20	342	605	4459	87	0	566	812	7948	500	178	1907	1244
21	0	495	3235	0	2532	95	284	2773	0	0	0	319
22	0	0	0	0	0	0	0	196	0	98	0	0
23	48	466	1125	0	313	44	144	1411	37	0	22	153
Total	13137	7259	38943	4118	12060	9210	4974	40283	6307	2502	24502	10667

Zone	13	14	15	16	17	18	19	20	21	22	23	Total
1	604	47	1309	0	0	0	97	190	83	0	48	19510
2	88	26	0	0	0	0	29	0	0	0	15	2509
3	302	0	85	23	0	0	0	112	0	28	731	10630
4	118	43	76	0	0	152	0	0	0	0	27	6225
5	1037	302	166	21	23	0	0	89	0	0	47	8013
6	42	19	38	0	0	0	0	0	19	0	92	2261
7	0	0	0	0	0	0	0	0	0	0	49	64
8	76	0	0	0	0	0	0	76	24	0	654	657
9	133	0	19	24	0	0	0	0	0	0	31	3305
10	124	26	0	159	26	0	0	109	0	0	46	6185
11	362	144	187	195	0	0	24	207	0	0	52	14585
12	4569	1824	280	27	22	43	57	938	73	0	53	13761
13	187	0	0	0	0	0	0	0	0	0	11	526
14	110	107	0	0	0	0	0	0	0	0	0	527
15	912	91	8722	23	0	0	0	122	170	0	183	6697
16	241	221	211	15891	26	0	126	239	47	0	57	15891
17	289	0	364	0	5292	0	0	0	145	0	2	4572
18	0	86	0	0	0	2600	0	0	0	0	0	8043
19	720	253	84	128	0	128	87885	84	0	0	225	17563
20	5277	2780	151	1198	0	0	0	65731	446	0	105	18648
21	331	0	593	0	0	0	0	83	38169	0	0	9733
22	0	0	196	0	0	0	0	0	0	0	0	294
23	0	264	342	15	0	124	265	14	82	0	122	3763
Total	15522	6233	12823	17704	5389	3047	88483	67994	39258	28	2550	173962

## 4.5 Modal Split Traffic

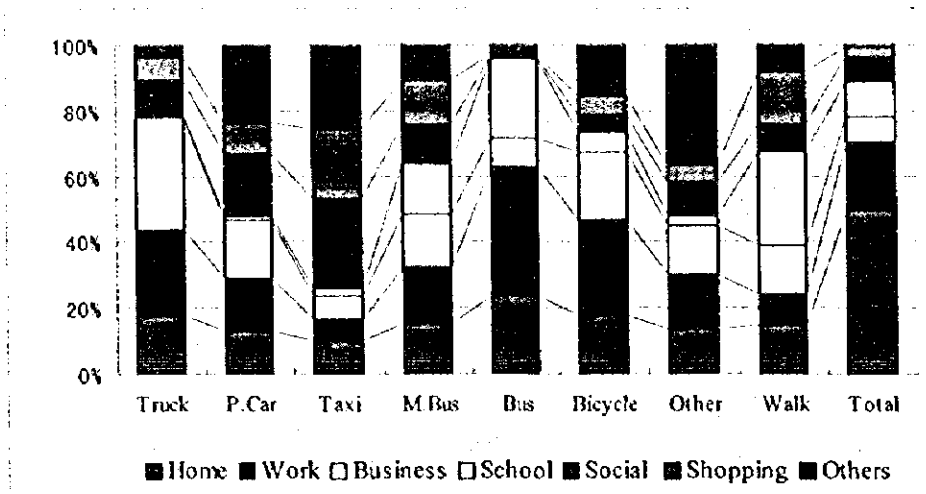
### 4.5.1 Modal Split by Purpose

The number of trips categorized by mode of transport and purpose is shown in Table 4.5.1, and the modal split by purpose is shown in Figure 4.5.1. According to these data, the use of minibuses is high (33%). By walking (29%), use of passenger cars (15%) and use of taxis (13%) follow to use of minibuses. Walking sees the predominant proportion (56%) of those who commute to school.

The use of minibuses is high in any travel purpose, especially in "to work", "to school", "business" and "to home" shares exceed 30%. The use of taxis is high among those whose trip purpose falls in the category of "social activities", "shopping" or "others". The use of passenger cars shows in rather high shares (18% to 27%) in any trip purposes excluding "to school" and "shopping". Buses are used to transport workers (13%) and students (8%). Including return trip from schools and work places, 94% of bus use trips results in "to work" or "to school" related trips. From this result it is concluded that buses are in category of "private mode".

**Table 4.5.1 Modal Share by Purpose**

Number of Trips by Purpose								
	Home	Work	Business	School	Social	Shopping	Others	Total
Truck	30,165	18,403	8,578	161	2,745	718	81	60,851
P.Car	292,269	155,658	58,190	5,770	67,578	12,639	7,653	599,757
Taxi	247,369	71,632	26,007	11,960	107,106	31,073	9,085	504,233
M.Bus	642,674	310,631	98,005	133,763	78,113	33,992	6,269	1303,447
Bus	155,848	111,341	8,536	34,183	832	266	269	311,275
Bicycle	28,723	19,856	4,885	1,926	1,366	551	359	57,666
Other	4,174	2,164	660	156	492	94	160	7,900
Walk	576,071	156,963	86,336	238,328	51,173	36,073	4,602	1,149,547
Total	1,977,292	846,649	291,198	426,247	309,405	115,406	28,477	3,994,674
Modal Share by Purpose								
	Home	Work	Business	School	Social	Shopping	Others	Total
Truck	1.5%	2.2%	2.9%	0.0%	0.9%	0.6%	0.3%	1.5%
P.Car	14.8%	18.4%	20.0%	1.4%	21.8%	11.0%	26.9%	15.0%
Taxi	12.5%	8.5%	8.9%	2.8%	34.6%	26.9%	31.9%	12.6%
M.Bus	32.5%	36.7%	33.7%	31.4%	25.2%	29.5%	22.0%	32.6%
Bus	7.9%	13.2%	2.9%	8.0%	0.3%	0.2%	0.9%	7.8%
Bicycle	1.5%	2.3%	1.7%	0.5%	0.4%	0.5%	1.3%	1.4%
Other	0.2%	0.3%	0.2%	0.0%	0.2%	0.1%	0.6%	0.2%
Walk	29.1%	18.5%	29.6%	55.9%	16.5%	31.3%	16.2%	28.8%
Total	49.5%	21.2%	7.3%	10.7%	7.7%	2.9%	0.7%	100.0%

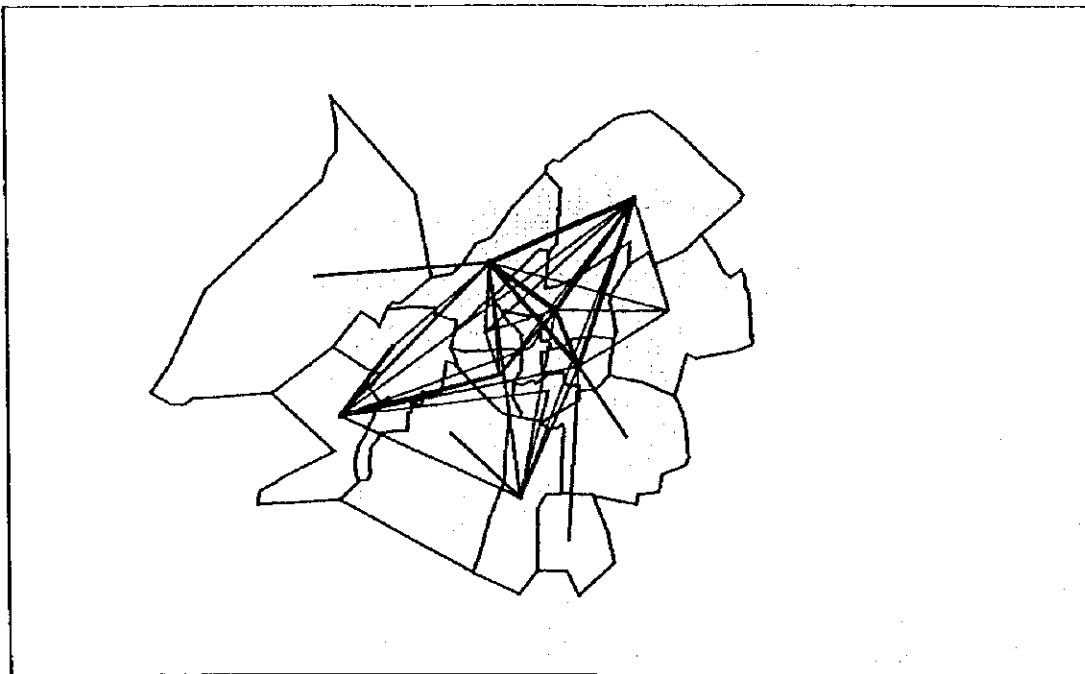


**Figure 4.5.1 Modal Share by Purpose**

### 4.5.2 Trip Distribution by Mode

The desire line of passenger cars by integrated zones is shown in Figure 4.5.2 and of microbuses is in Figure 4.5.3. The trip flow by "Passenger car" forms a big axis from north-east to south-west. In particular, the flow between zones 15 - 1 or 8 - 3 are significant.

"Microbus" flow forms the same axis as whole traffic flow.



**Figure 4.5.2 Present Desire Line (All Purpose, Car)**

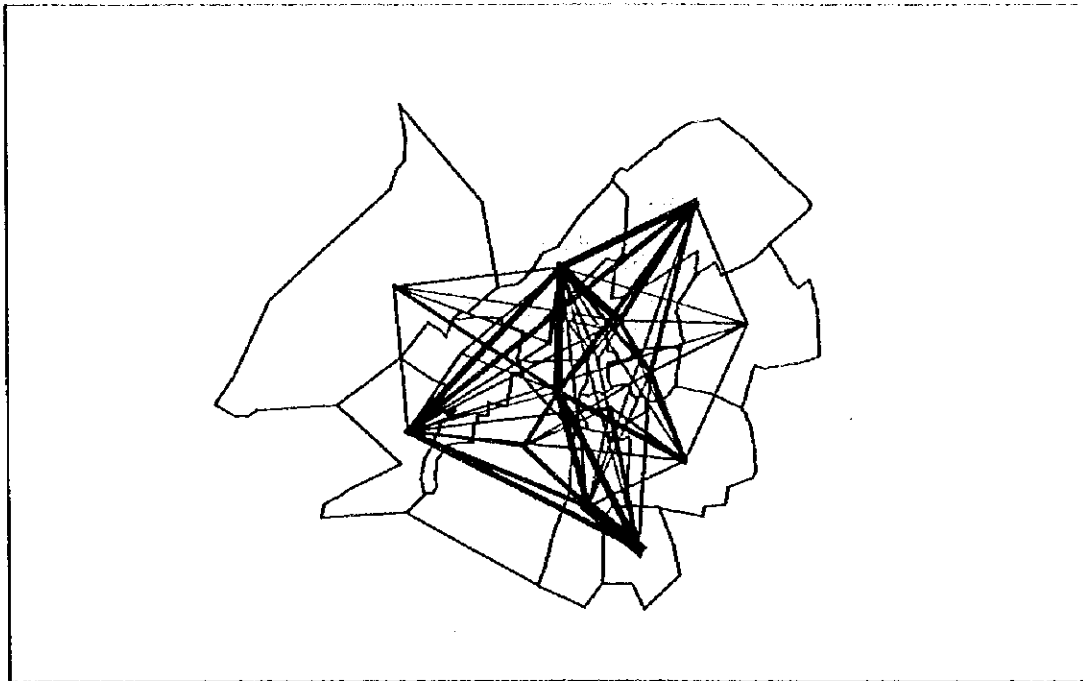


Figure 4.5.3 Present Desire Line (All Purpose, Microbus)

### 4.5.3 Travel Time and Distance by Mode

#### (1) Travel Time by Mode

Figure 4.5.4 shows the modal split by travel time. The following can be derived from this table.

- 1) The travel time of walking trip is 30 minutes at most.
- 2) The use of private cars and taxis is independent from the travel time.
- 3) The share of microbus shows outstanding figures from 45 minutes.
- 4) The share of work bus (indicated as bus) usage remains constant for travel times of 45 minutes or more.

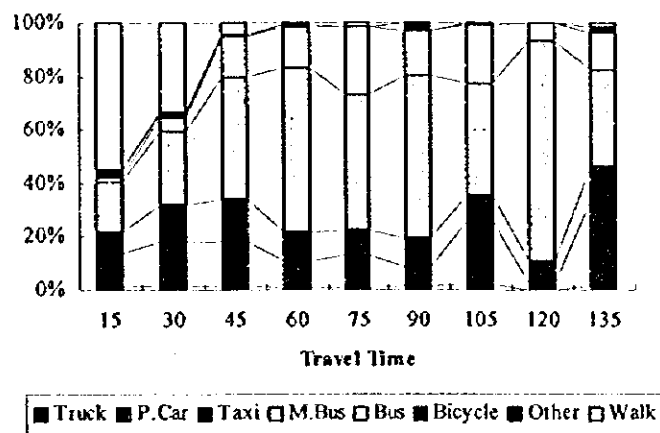


Figure 4.5.4 Modal Share by Travel Time

## (2) Travel Distance by Mode

Figure 4.5.5 shows the modal split by traveling distance, as calculated on the basis of the actual distance along main road. The share of “walk” trip is dominant within 1 km distance and has meaning share until 3 km distance. “Passenger car” shows steady share which means passenger car users exclusively use cars for their transport mean. “Taxi” share decreases after 7 km and “micro bus” substitutes the less of “taxi”. “Bus” shows also steady shares in all of distance range. In general the modal share shows very steady movement excluding “walk” trips.

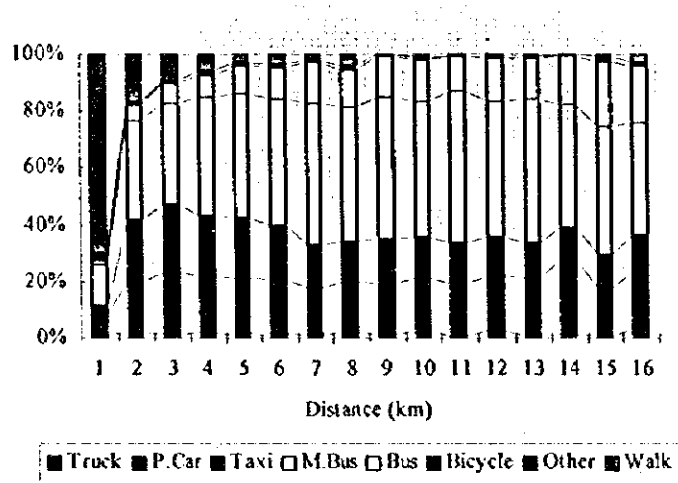


Figure 4.5.5 Modal Share by Travel Distance

## **Chapter 5. ROAD NETWORK AND TRANSPORT FACILITY CONDITION**

### **5.1 Road and Urban Projects Administration**

Urban infrastructure projects in Damascus Governorate are entirely self-covered by the Governorate revenues according to the Law No. 1 issued on January 1<sup>st</sup>, 1994. Large-scale infrastructure projects, however, may receive subsidy from the national budget by the approval of the Prime Minister. The organization chart of the Governorate is presented in Figure 5.1.1.

#### **5.1.1 Road Administration System**

Construction of roads is under the responsibility of the Department of Technical Affairs, which includes the two main sectors of Projects and Urban Planning. The Projects Sector includes eight sections for planning and implementation of infrastructure projects including the Roads Section, as shown in Figure 5.1.2.

For the implementation of road projects inside the jurisdiction of the Governorate, the official procedure can be summarized as follows:

- (1) The project should be mentioned in the long-term general plan of the city after which it can be included in the annual or 5-year plan.
- (2) The Land Acquisition Planning Section prepares the plan for acquisition.
- (3) Acquisition of land by the Acquisition Office requires approval of the Prime Minister Office, and there is no need for such approval if the road is located inside an approved urbanization area under the Law 9 of 1974 or Law 60 of 1979. In such case, the Governorate acquires the land directly as it is considered as public land. Law 9 allows the land owners to re-own readjusted land after acquiring required infrastructure land while Law 60 gives landowners compensations and land becomes as public ownership.
- (4) The Acquisition Office should do inventory for all land occupants and the office should inform the occupants and arrange for relocation areas and houses.
- (5) The land acquiring procedure should be done based on the logistic rules and steps through the Acquisition Office.
- (6) The Implementation Department prepares required implementation plans and studies.
- (7) The Governorate allocates the required budget and includes the project in the financial plan through the Projects Accounting Section in the Financial Department.
- (8) The Contracting Department announces the tender documents and reviews the tenders to select the best one and finalize the contracting procedures.
- (9) The contract should be approved by the Economic Commission and the State Council.
- (10) Implementation starts under the supervision of the Implementation and Follow-up Department to prepare the road for operation.

Maintenance of roads is under the responsibility of the Department of Technical Affairs' Maintenance Section, which has two sub-sections for planning and workshops.

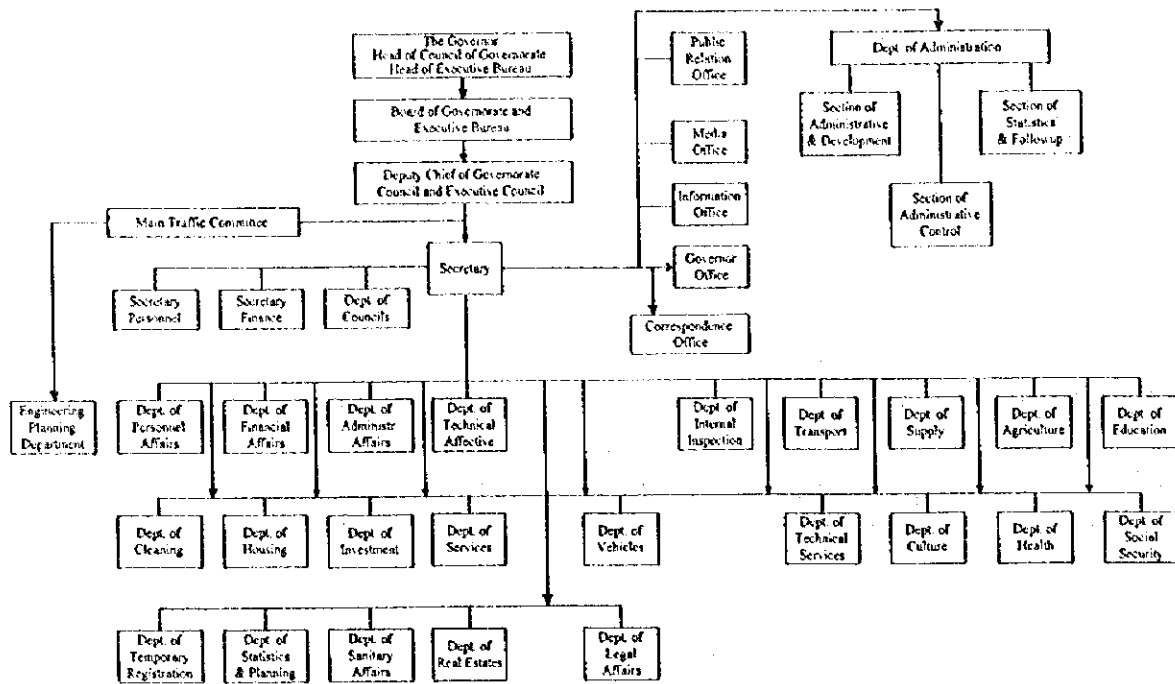


Figure 5.1.1 Organization Chart of Damascus Governorate

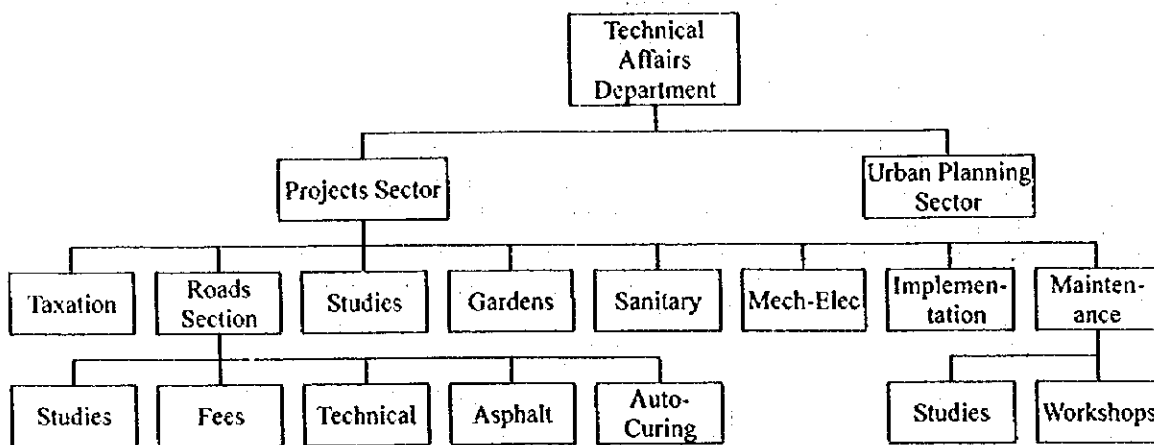


Figure 5.1.2 Road Administration Organization

## 5.1.2 Urban Planning System

### (1) Damascus City Planning

The Studies & Planning Section in Damascus Governorate is in charge of city planning. The last master plan of Damascus was made by the French engineer Eckoshar and Japanese-French engineer Banshoya, in the sixties, which is presented in more details in Chapter 2. This master plan was certified in 1968 and it was prepared for the city expansion till 1984, which was expected to be 1.5 million people in population.

There was no restriction to this master plan and plans of some areas and streets were executed according to it. Some other executed streets were not mentioned in it, like the north bypass. Some irregular extension areas encroached the protected green areas, such as the Muadamiyeh, Tabbaleh, Dwaila'a, Jobar, and Tishreen quarter in Qaboun.



Damascus Governorate had to acquire some houses for new projects, like south entrance of the city, south bypass, and the new sanitary sewage project. According to the applied regulation, the Governorate should provide affected people with suitable substitute houses, so it possessed some areas out of its administrative border to construct such houses. In other cases, when the Governorate decided to remove the industrial area out of Al Fahameh and Kafar Souseh, it had to construct another an industrial area in Hosh Blass (south of Damascus) which is out of the administrative border.

## **(2) City Planning Laws and Acts**

The master plan is executed within certain regulations, i.e. for the already constructed areas, the decree No. 5 for the year 1982 is applied, where a plan is made for specified areas to widen the streets and to improve the shapes of buildings and construct services and green areas. This plan is executed when the owners of buildings apply to renew their buildings, while schools, parks and service centers are executed through appropriation according to Appropriation Decree No. 20 or 60. Major planning issues and projects are as follow:

- 1) Concerning planning of new areas, the Law No. 9 for the year 1974 (obliged distribution) is applied and it takes more than ten years for implementation, like, All Bahsa zone, west of Al Hal, east of Al Marjeh, Al Adawi, part of Midan, Kafar Susseh. This law was replaced by Law No. 60, issued later in 1979, to be applied if the area is vacant permitting the state to appropriate it to make housing area or other, like the area close to Al Tadamon.
- 2) Additionally, the Housing Institution executed a master plan for several areas according to Saving Law, inside and outside of the main master plan, like, Qudsaya (10,000 units for 60,000 persons) which is under construction, and expected to be attached to Damascus.
- 3) The Military Housing Institution constructed Al Assad Villages in Dimas (40,000 person) and Al Assad housing area, north of Damascus, for 40-50 thousand persons. Four years ago, General Housing Institution made a study for a new housing project in Qasyoon for 100,000 persons, but the project was terminated because the target area was outside of the main master plan.
- 4) In late seventies, Dummar housing project was constructed (100,000 persons), outside Damascus border but later it has been attached to the city.

## **5.2 Functional Road Hierarchy of Present Network**

Road classification systems can be defined in several ways but one of the most useful for planning purposes is to consider the functional hierarchy of the road reflected on its operating characteristics, as the road function will not be often clear-cut and a balance has to be achieved with involved physical and operational factors. In existing urban areas, road functions tend to be determined by current land-use activities, which are often mixed and can not be changed in short- to medium-term planning. It is possible, however, to assign an order of priority to the functions of the road network and to change road operating characteristics through the use of traffic management measures. Such process is mostly applied to identify the present road network malfunction and appropriate improvement projects in order to develop the road network.

The functional road hierarchy was established by classifying the roads into four classes based on the criteria of road function and free-flow speed ( $V_{max}$ ) as presented in Table 5.2.1. Functions and characteristics of each category can be summarized as follows:

- 1) **Arterial Distributor:** It has the function of a strategic road in nature and serves fast moving long distance heavy traffic either on bypasses to urban areas, ring roads or radials with grade separated intersections and no frontage access and slow traffic.
- 2) **Main Distributor:** It has high standard of design as ring or radial roads which serve medium and long distance inter-zonal traffic with grade separation structures at main intersections and signalization at others. Ideally, no direct access to land use activities should be permitted and public transport systems can be accommodated.
- 3) **Secondary Distributor:** This category should have controlled intersections and serves as feeder roads for access to large activity centers and to main and arterial distributors, and handles medium distance traffic and public transport systems with restrictions for large-sized vehicles.
- 4) **Local Distributor:** It has mixed roadside commercial and residential activities as well as pedestrian facilities, and handles local and intra-zonal vehicle movements with low speed and restrictions for large- and medium-sized commodity vehicles.

Lower categories include pedestrian and narrow commercial streets, which can not provide reasonable speed for traffic movement.

**Table 5.2.1 Road Classification Criteria**

Road Category	Speed ( $V_{max}$ ) -- km/hr
Arterial Distributor	$V_{max} > 60$
Main Distributor	$40 \leq V_{max} \leq 60$
Secondary Distributor	$20 \leq V_{max} \leq 40$
Local Distributor	$V_{max} < 20$

This approach identified that many of the existing and incipient traffic problems are caused by the mixed functions of many streets and the incompatibilities between their functions. Roads which should function as through traffic movement routes often have considerable land-use activities which cause conflict with the through traffic movement function. As presented in Figure 5.2.1 and 5.2.2, the category of arterial distributors with a speed higher than 60 km/hr in the present road network includes the following roads:

- President Hafez Al-Assad Motorway (South Bypass)
- New Beirut Road
- Othman Ibn Afaan Street (South Entrance)
- 6<sup>th</sup> Tishreen Street (Aleppo Road)
- International Airport Road
- Al Qunaitera Road

Other radial roads as well as the inner ring road are functioning at present as only the main and secondary distributors of the network. For the assumed ring roads and bypasses of the city, the desired function should be clearly determined especially with the rapid expansion in land-use activities. It can be also shown that the few main distributors inside the central area are not composing a well-connected network and most of the connecting roads have lower functional categories.



**Figure 5.2.1 Present Road Network Classification --Planning Area**



**Figure 5.2.2 Present Road Network Classification --Study Area**

Figure 5.2.3 and Figure 5.2.4 show the road network in the city center and the study area. The broad lines show the trunk roads.

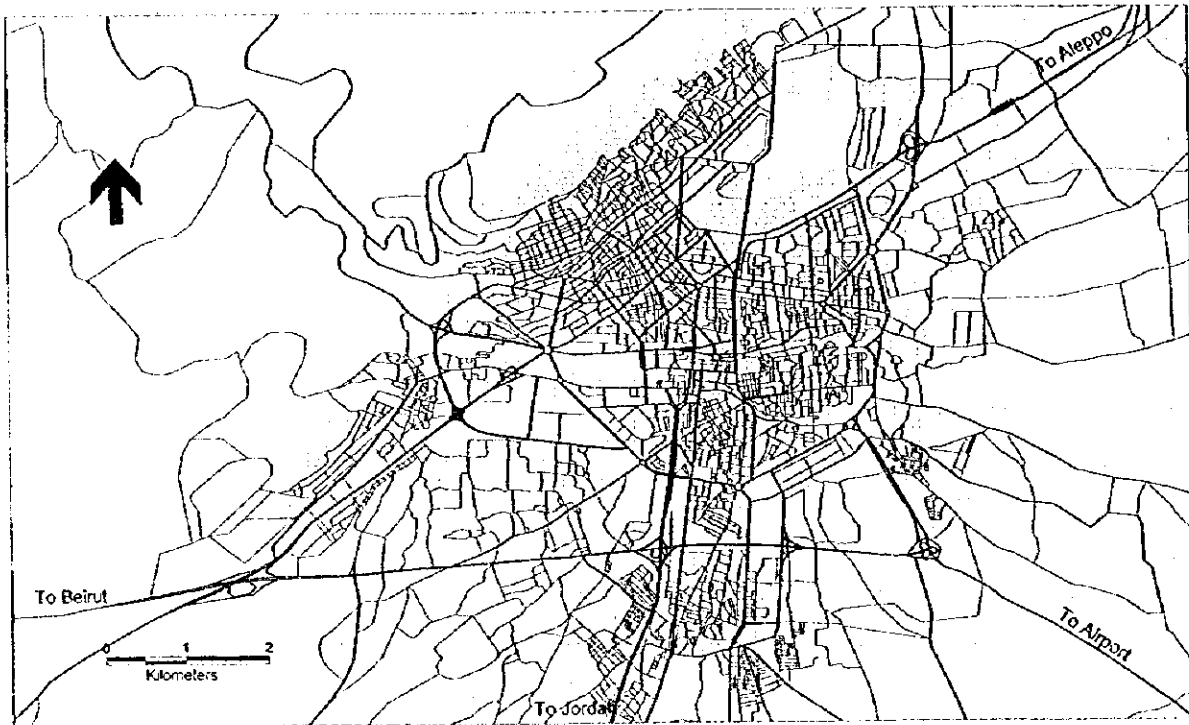


Figure 5.2.3 Road Network in Urban Area

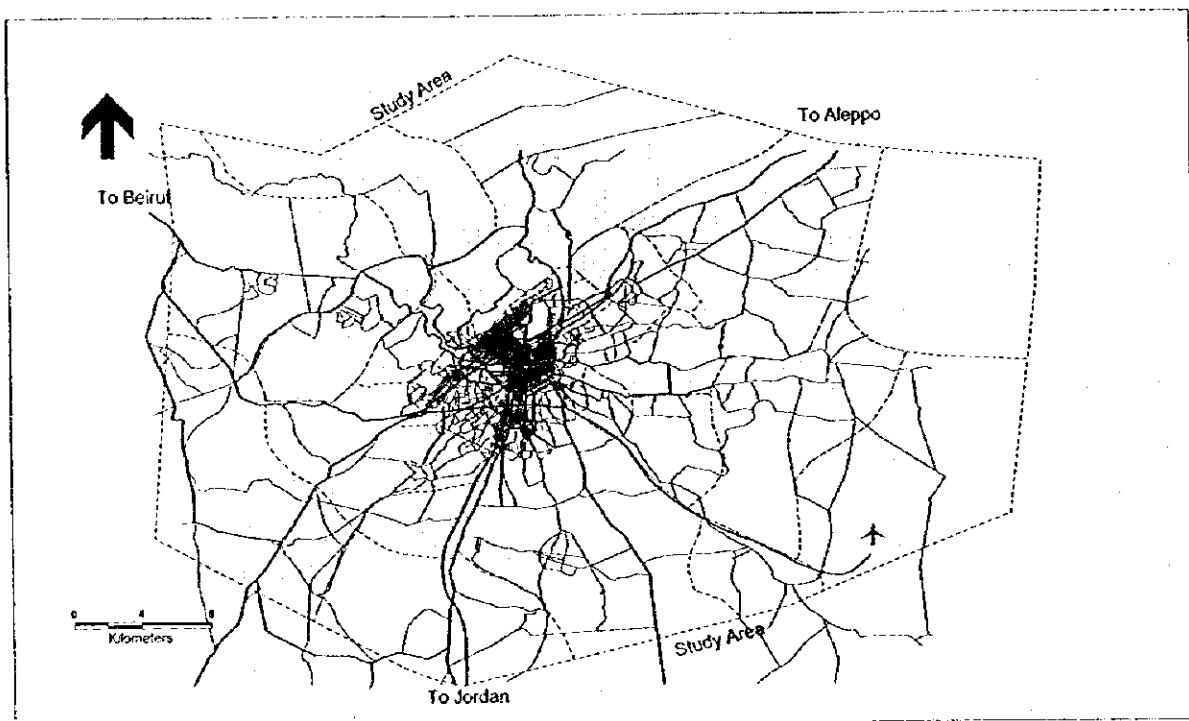


Figure 5.2.4 Road Network in Study Area

## 5.3 Road Network Characteristics

### 5.3.1 Road Network Pattern

The present road network in the study area consists of several radial highways as Aleppo, Airport, Amman and Beirut highways. Some are old highways while others are newly constructed. An Inner Ring Road and two incomplete bypasses, namely the North and South Bypasses surround the city. Multi-grade interchanges are provided at most of the crossings of the two bypasses and radial arterial, while roundabouts are provided at most of the crossings with the inner ring.

The east-west axis of Shoukri Al Qouwatly street stops at the intersection with Ath Thawara street, because of dense residents are surrounding the Old City. The north-south axis of Ath Thawara street in the north and Khaled Ibn Al Walid street in the south are not well-connected at the city center. Two parallel one-way streets of Baghdad and Murshed Khater streets provide east-west axis at the east part of the city just to the north of the Old City.

Barada river, which runs through the city center in the west - east direction, is covered at Shuhada square in the city center and to serve as a local street in the commercial area. The road network within the area of Old Damascus consists of narrow and winding streets with historical stone pavement at some places, despite the high concentration of commercial and small-scale manufacturing industries. From 8 Azar square to the southeast, about 300m length of a pedestrian shopping mall of Jamal Abdel Nasser street is provided.

### 5.3.2 Road Length

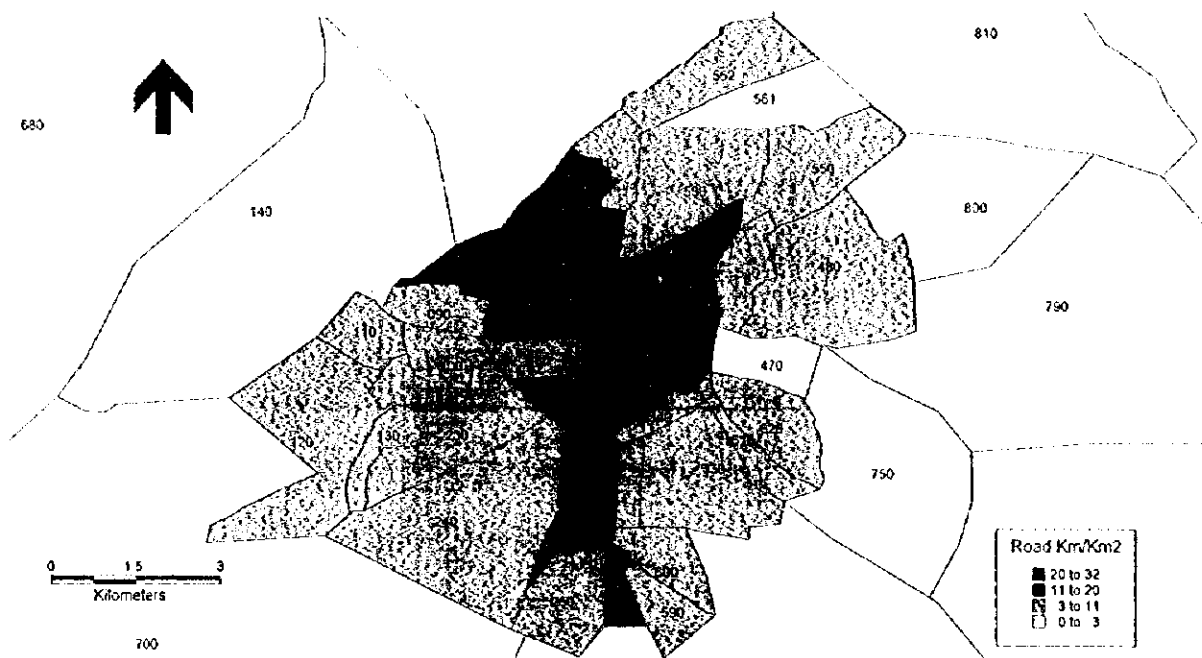
The road network length of each traffic zone in Damascus Governorate is summarized in Table 5.3.1. The entire length of the network was calculated at 722 km, of which 29% or 207 km can be classified as arterial roads.

Table 5.3.1 Road Length by Zone

Zone	Sub-Zone	Area (km <sup>2</sup> )	Road Length			Road Density (km/km <sup>2</sup> )	Road Density (km/1000 inhabitants)
			Non-Arterial (km)	Arterial (km)	Total (km)		
1	0	1.150	11.41	0.48	11.89	10.34	0.25
2	0	0.762	10.04	2.95	12.99	17.05	0.43
3	0	0.400	5.43	0.88	6.31	15.78	0.34
4	0	0.438	8.60	0.63	9.23	21.07	0.36
5	0	0.618	13.15	0.95	14.10	22.82	0.62
6	0	0.569	10.92	1.50	12.42	21.83	0.56
7	0	0.491	8.37	1.43	9.80	19.96	0.89
8	0	0.578	5.68	0.89	6.57	11.37	0.73
9	0	1.230	6.72	6.61	13.33	10.84	3.23
10	0	1.346	4.54	5.15	9.69	7.20	1.64
11	0	1.259	5.86	0.16	6.02	4.78	0.89
12	0	5.657	25.41	7.48	32.89	5.81	0.38
13	0	1.623	11.38	3.56	14.94	9.21	0.71
14	0	21.257	13.78	12.41	26.19	1.23	0.54
15	0	1.280	9.33	8.53	17.86	13.95	0.92
16	1	0.251	4.33	1.00	5.33	21.24	
16	2	0.624	6.09	5.02	11.11	17.80	
16	3	0.477	8.36	4.24	12.60	26.42	
16Subtotal		1.352	18.78	10.26	29.04	21.48	1.73

Zone	Sub-Zone	Area (km <sup>2</sup> )	Road Length			Road Density (km/km <sup>2</sup> )	Road Density (km/1000 inhabitants)
			Non-Arterial (km)	Arterial (km)	Total (km)		
(Continued)							
17	1	0.326	4.00	2.57	6.57	20.15	
17	2	0.249	3.77	1.93	5.70	22.89	
17-Subtotal		0.575	7.77	4.50	12.27	21.34	1.21
18	0	0.993	4.70	5.50	10.20	10.27	1.78
19	0	0.401	5.40	3.99	9.39	23.42	1.07
20	0	0.169	4.24	0.00	4.24	25.09	0.52
21	0	0.114	2.30	0.96	3.26	28.60	0.40
22	0	0.643	5.95	3.10	9.05	14.07	0.45
23	0	3.189	15.87	3.62	19.49	6.11	0.74
24	0	7.605	49.25	8.82	58.07	7.64	0.86
25	0	2.162	14.88	3.01	17.89	8.27	0.28
26	0	0.628	3.59	2.42	6.01	9.57	0.26
27	0	0.322	5.00	0.98	5.98	18.57	0.46
28	0	0.194	4.44	0.07	4.51	23.25	0.44
29	0	0.423	3.87	0.96	4.83	11.42	0.51
30	0	0.444	7.27	2.40	9.67	21.78	1.00
31	0	0.950	10.48	5.65	16.13	16.98	0.52
32	0	0.224	3.88	0.20	4.08	18.21	0.55
33	0	3.717	10.24	11.77	22.01	5.92	0.48
34	0	0.534	2.99	2.67	5.66	10.60	0.91
35	0	0.195	2.34	1.01	3.35	17.18	0.91
36	0	0.190	3.58	0.44	4.02	21.16	0.45
37	0	0.323	4.34	0.82	5.16	15.98	0.81
38	0	0.140	2.66	0.73	3.39	24.21	0.50
39	0	0.080	2.09	0.17	2.26	28.23	0.57
40	0	0.247	4.59	0.00	4.59	18.58	4.50
41	0	0.110	2.75	0.40	3.15	28.64	0.94
42	0	0.154	2.22	0.00	2.22	14.42	0.66
43	0	0.313	5.14	0.74	5.88	18.79	0.66
44	0	0.251	6.02	1.89	7.91	31.51	0.63
45	0	0.332	5.88	0.19	6.07	18.28	0.57
46	0	0.526	5.91	3.55	9.46	17.98	0.77
47	0	1.474	3.36	0.00	3.36	2.28	1.31
48	0	5.629	18.52	1.69	20.21	3.59	0.40
49	0	0.714	6.32	2.67	8.99	12.59	0.45
50	0	0.720	8.75	4.83	13.58	18.86	0.64
51	0	1.347	6.26	1.39	7.65	5.68	0.30
52	0	0.470	2.46	3.31	5.77	12.28	0.58
53	0	3.779	8.47	7.88	16.35	4.33	0.62
54	0	0.477	6.70	3.74	10.44	21.89	0.87
55	0	3.128	1.64	11.40	13.04	4.17	0.26
56	1	2.365	2.60	3.02	5.62	2.38	
56	2	2.758	6.91	2.24	9.15	3.32	
56-Subtotal		5.123	9.51	5.26	14.77	2.88	0.20
57	0	0.161	3.52	0.87	4.39	27.27	0.18
58	0	0.525	6.42	0.00	6.42	12.23	0.12
59	0	1.124	3.15	1.10	4.25	3.78	0.12
60	0	1.361	11.15	3.60	14.75	10.84	0.20
61	0	0.944	5.11	0.63	5.74	6.08	0.25
62	0	2.063	14.48	3.75	18.23	8.84	0.47
63	0	89.107	20.09	20.94	41.03	0.46	0.60
Total		191.354	514.95	207.49	722.44	3.78	0.49

The average road density in Damascus Governorate is 3.78 km/km<sup>2</sup>, and the highest density is seen in zone 41 (28.6 km/km<sup>2</sup>, Mazanet Al Shahem in Old Damascus area), followed by zone 39 (28.3 km/km<sup>2</sup>, Sweka, southwest of Old Damascus area). Most of the roads in these zones, however, are narrow. A road density map on zonal base is presented in Figure 5.3.1. The commercial area of zones 16, 17, 19 and 20 show high road density of about 20 km/km<sup>2</sup>.



**Figure 5.3.1 Road Density by Zone**

### 5.3.3 Geometric Features of Arterial Roads

The main arterial roads handling heavy traffic in the city are the following four roads with their cross sections clarified in Figure 5.3.2.

#### (1) South Bypass

It has a total length of about 21.0 kilometers connecting the new Beirut road in the west to Daraa road to the east. The eastern section of the bypass with a length of about 5.5 kilometers is not yet completed as it passes through gardens and illegal housing areas. It has in total 12 interchanges, in which only seven interchanges are completed. Other structures include also a 2-kilometer overpass to avoid the populated areas south of the city. The road cross-section has four lanes in each direction with a 5 meters median.

#### (2) North Bypass

This bypass starts at the planned Saboura interchange at the new Beirut road and passes through Sahara interchange. It has a total length of 38 kilometers, in which only 20 kilometers are completed and under operation including four bridges with 350 meters length for the longest and 35 meters height for the highest pier at the mountainous areas. The road cross-section has 3-4 lane for each direction and 5 meters median. About 8 kilometers in the last section were constructed as separated segments and the road is expected to be completed in the near future as there are no resettlement or financial problems for implementation.

#### (3) Amman Highway

This is the southern entrance road of the city where an improvement scheme was recently implemented. Improvements were partially implemented inside the Governorate jurisdiction for a length of about 10 kilometers. The cross-section of the carriageway is designed to accommodate, in the future, depressed railway lines in the middle part between the two directions of the road which have three lanes each.

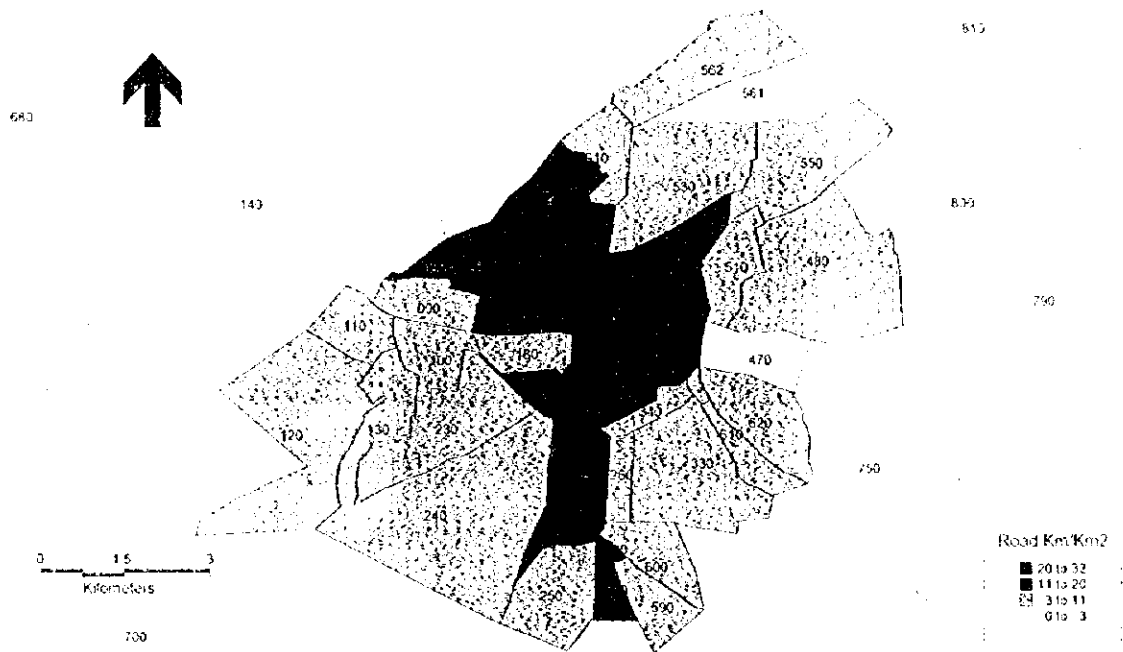


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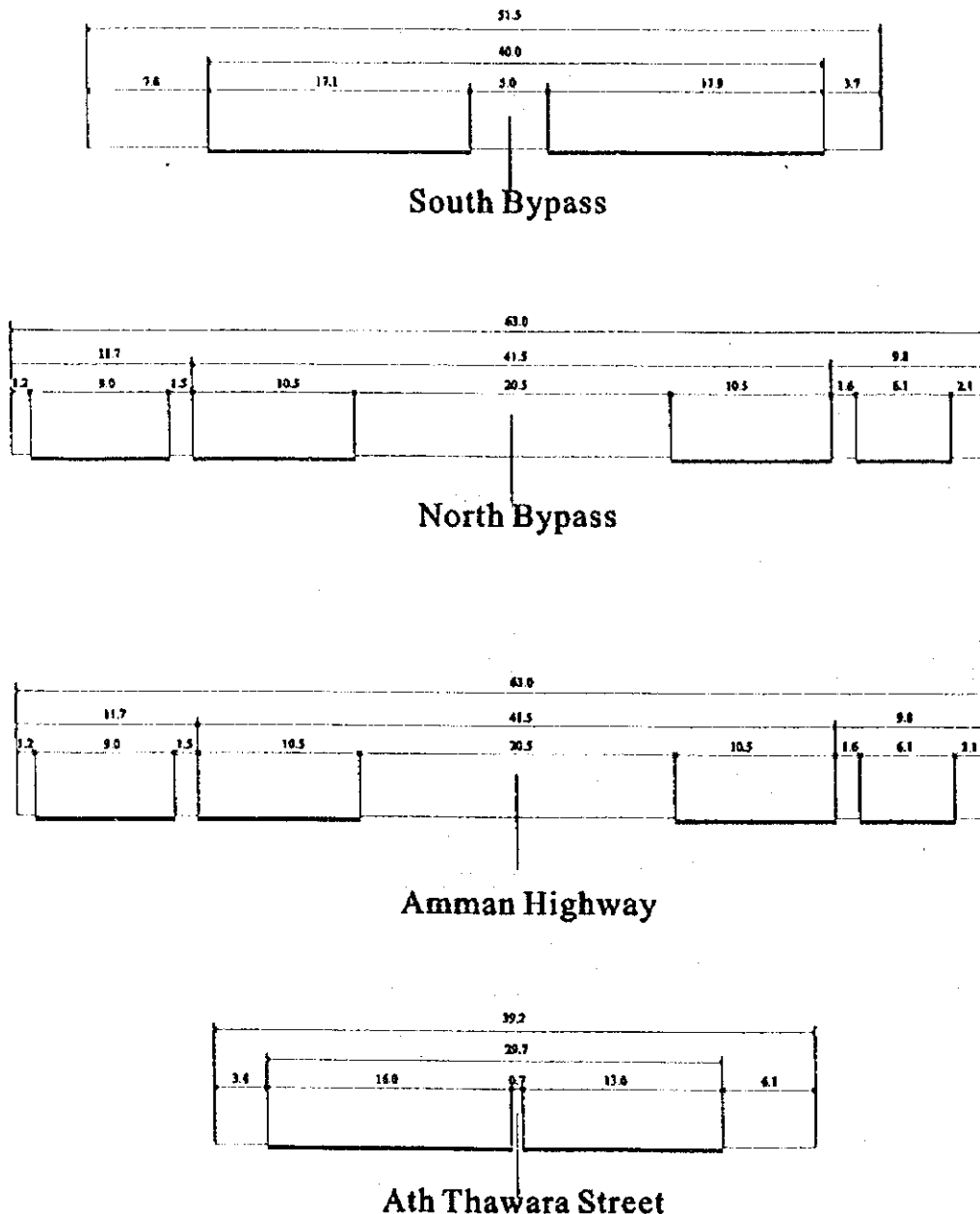
This is the southern entrance road of the city where an improvement scheme was recently implemented. Improvements were partially implemented inside the Governorate jurisdiction for a length of about 10 kilometers. The cross-section of the carriageway is designed to accommodate, in the future, depressed railway lines in the middle part between the two directions of the road which have three lanes each.



The width of the road is divided as 17m for the railway and for each direction there are 10.5m of the road, 1m as Separation Island, 5m as service road and 5m as sidewalk with total width of 60 meters. To increase the level-of-service of the road inside the urban areas, grade-separation schemes are planned at five intersections, which are not yet implemented except that with the South Bypass.

**(4) Ath Thawra Street**

The street has two grade separated intersections, with Ittihad street (over-pass) and with Baghdad and Murshed Khater street (under-pass). The north side of the street connects with Aleppo highway and serves the main corridor to the north, however the south end connects with the Old Damascus fringe road, which the heavy vehicles cannot pass.



**Figure 5.3.2 Cross Section of Arterial Roads**

## **Chapter 6. PUBLIC TRANSPORT**

### **6.1 Public Transport Network**

#### **6.1.1 Introduction**

The public transport in the study area consists of;

- Intra-urban buses
- Sub-urban buses, and
- Taxis

The railway is operating at the very low frequency of 2-3 times a week, therefore it does not serve for daily commuting trips.

Almost all bus service is provided by 10-12 seat minibuses operated by private individual operators. The bus routes, fleet to be assigned to the routes, and the fares are designated by the Public Transport Department in the Ministry of Interior. Bus operators should apply to the lines they are interested in, and should be registered with payment of the fixed annual registration fee of SP 78 and SP 575 for the first time registration, beside the annual car registration fee. The fare level is adjusted based on the opinion of bus passengers and bus operators. The operation frequency is not designated and is not monitored. The buses are operating in accordance with the demand. The bus routes are designated in a descriptive manner and the buses show their routes also in a descriptive manner. The routes of each bus are controlled by the traffic police on streets.

#### **6.1.2 Intra-Urban Buses**

##### **(1) Bus Lines**

For the intra-urban buses, 115 bus lines are announced, however buses are not operating on 58 lines at present because low profitability of these lines.

Table 6.1.1 shows the present operating conditions of intra-urban buses. In total 4,123 buses are operating for the intra-urban bus lines. Reflecting the present city size, the average route distance (round trip) is 16.3 km, which is shorter than the route distances in other cities, which are 25 – 30 km. The average daily operating distance is 156.2 km, which is also shorter than the operating distance in other cities of about 200 - 250 km. This situation may cause longer idle time of buses at bus terminals.

Table 6.1.1 Intra Urban Buses

Seq	Route	Route Length (km)	Total Daily Freq.	Fleet	Daily Freq/Bus	Fare (SP)	Daily Operating Dist (km)
1	Daf Ashok , Mukayam , Baramkeh	11.40	86	12	7.17	3.00	81.7
2	South by pass	36.36	2,627	360	7.30	4.00	265.3
8	Baramkeh , Kaboun terminal	16.10	1,211	60	20.18	3.00	325.0
10	Tadamon , prefabricated buildings , Baramkeh	7.96	907	97	9.35	3.00	74.4
11	Old Barzeh	20.73	1,189	75	15.85	4.00	328.6
15	Bab Touma , Marjeh	10.02	144	5	28.85	3.00	289.1
16	Kassa'a , Tijara , Marjeh	11.53	307	15	20.44	3.00	235.6
23	Dahiyet Al Assad , Abasiyin	13.43	583	20	29.17	4.00	391.8
28	Marjeh , Shaik Kaled	10.00	487	25	19.48	5.00	191.8
30	Reken Addin , Iben Annafis	11.17	1,303	77	16.92	3.00	189.0
31	Mezzeh , Jabal 86	17.80	259	40	6.48	5.00	115.3
32	Muhajrin , Sikeh	9.95	270	36	7.50	4.00	74.6
37	Political Science Institute	26.66	0	1	0.00	6.00	0.0
41	Kaboun , Souk Al Hal	12.23	651	89	7.31	4.00	89.5
43	Muhajrin – Salamiyeh	8.69	1,041	97	10.73	5.00	93.3
44	Ruken Addin , Mezzeh Highway	20.03	0	2	0.00	5.00	0.0
45	Jibar , Mezzeh Highway	23.30	1,425	250	5.70	5.00	132.8
46	Dummar , Kudsaya	33.23	791	0			
49	Jobar -Taiba ; Mezzeh Highway	14.18	317	33	9.62	5.00	136.4
51	Hay Tishrin , old Souk Al Hal	11.63	563	49	11.49	4.00	133.6
52	Midan , Shaik Muhydin	11.98	1,518	163	9.31	5.00	111.6
53	Midan , Muhajrin	13.88	233	32	7.28	5.00	101.1
54	Muhajrin , sina'ah	17.01	1,825	250	7.30	5.00	124.2
56	Old Barzeh , Al Fallahin square	4.80	0	1	0.00	4.00	0.0
58	Abassiyin , Tishrin Hospital	9.15	862	46	18.73	3.00	171.4
59	Mukayam Falastin , Mezzeh Highway	13.92	706	89	7.94	5.00	110.5
60	Mukayam Al Yarmouk , Mezzeh Highway	20.38	746	127	5.88	5.00	119.8
61	New Zahira , Mezzeh Highway	21.90	0	2	0.00	5.00	0.0
62	Daiyet Al Shouhada , Al Assad Bridge, Mezzeh	18.47	0	1	0.00	4.00	0.0
63	Shaik Muhydin	15.47	0	14	0.00	3.00	0.0
64	Mukayam Al Yarmouk , Kaboun terminal	6.82	1,674	222	7.54	4.00	51.4
65	Mukayam Falastin , Kaboun terminal	19.63	636	82	7.76	4.00	152.3
66	Barzeh-first highway , Souk Al Hal	19.71	564	41	13.76	3.00	271.1
67	Barzeh-Massaken , Fayhaa Jabal	11.09	589	90	6.54	5.00	72.6
69	Barzeh – Massaken , Bab Touma	8.65	0	1	0.00	4.00	0.0
72	Baramkeh , Dahadil	6.87	641	50	12.82	4.00	88.1
73	Dahadil , Bayader Nader , Baramkeh	9.38	218	17	12.82	5.00	120.3
75	Kadam - Assali , Baramkeh	12.04	795	70	11.36	4.00	136.7
76	Mezzeh - Jabal , Kaboun terminal	12.06	2,019	298	6.78	5.00	81.7
81	Mezzeh Highway , Al Somariyeh	26.21	322	38	8.47	5.00	222.1
82	Ruken Addin , Barniyeh	8.04	442	76	5.82	3.00	46.8
83	Naher Aisheh , Baramkeh	9.87	440	43	10.23	4.00	101.0
85	Baramkeh , Industrial area	8.78	6	1	6.00	3.00	52.7
86	Dwaila'a , Baramkeh	11.57	792	73	10.85	4.00	125.5
88	Dwaila'a , Kaboun terminal	12.06	383	30	12.77	3.00	154.0
91	Jaramana , Kaboun terminal	19.67	482	0		3.00	
92	Mezzeh , Jabal	11.76	453	55	8.24	3.00	96.9
94	Kassa'a , Bab Touma , The University	9.12	789	81	9.74	3.00	88.8
96	Mukayam Al Yarmouk , Old Zahira , Baramkeh	11.50	457	71	6.44	3.00	74.0
97	Mukayam Falastin , Baramkeh	14.16	505	84	6.01	3.00	85.1
98	Al Takadom quarter , Baramkeh	13.40	407	71	5.73	4.00	76.8
101	North by pass	25.85	2,912	350	8.32	5.00	215.1
107	Midhat Basha , Abassiyin	9.60	186	14	13.26	3.00	127.3
110	Mezzeh - Western Villas	14.19	479	83	5.77	4.00	81.9
111	Kassa'a , Tijara , The University	12.59	358	32	11.19	3.00	140.9
114	Kafar Souseh , Mahayni	15.91	722	22	32.82	3.00	522.1
115	Kafar Souseh , the eastern	14.61	2200	62	35.49	3.00	518.5
Total		828.50	39,522	4,125	9.58		156.2

Note: Fares are for the entire routes.

Source: Operating frequency was surveyed by the Study Team

Route distance measured by the Study Team

Fleet and fare from Ministry of Interior

### (2) Hourly Fluctuation

The hourly fluctuation of frequencies at the exits of bus terminals of all the surveyed bus lines are given in Figure 6.1.1. Two peaks appear in the figure. The highest peak at 14:00 - 15:00 with the hourly factor of 8.1% and the second peak at 9:00 - 10:00 with the hourly factor of 7.8%.

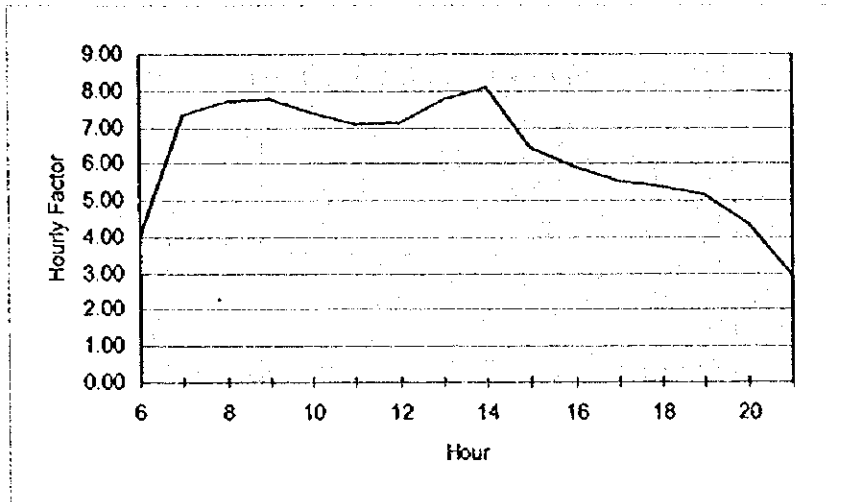


Figure 6.1.1 Hourly Fluctuation

### (3) Bus Flow

The buses were assigned to the bus route network in accordance with the observed bus numbers in the lines. The results are given in Figure 6.1.2. The heaviest bus flow was seen on Fares Al Khuri Street with 14,800 buses/day for both directions. The average peak hour head is calculated at 6 seconds. Khaled Bin Al Walid street in the South direction has also high concentration of buses with 10,600 buses/day for both directions.

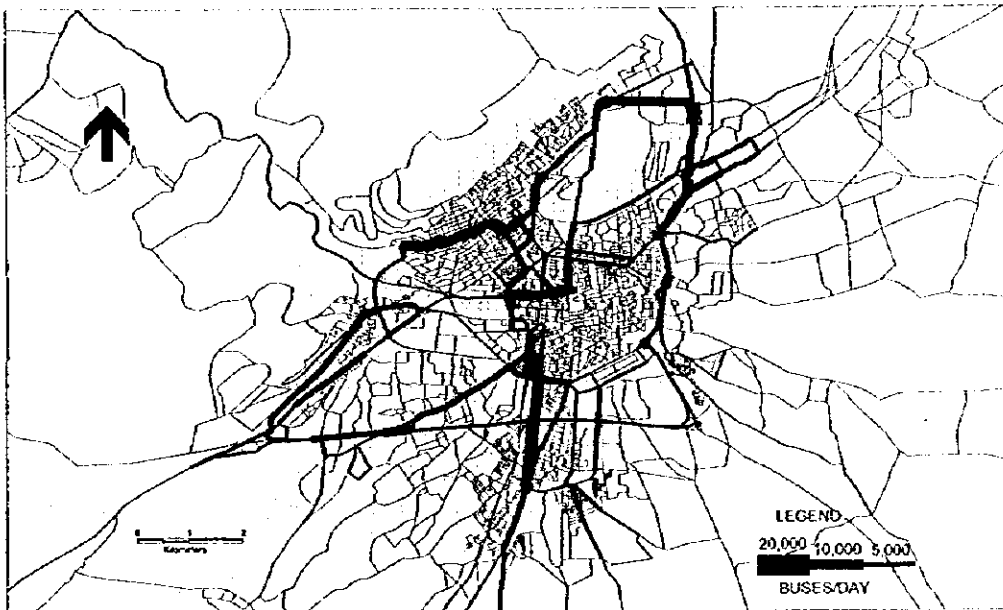


Figure 6.1.2 Intra-urban Bus Flow

### 6.1.3 Sub-Urban Buses

In the sub-urban bus lines, including sub-urban to sub-urban village lines, 374 lines are announced, however the buses are operating on only about half of these lines. Table 6.1.2 shows the suburban bus lines, which have their origin/destination within Damascus urban area. 241 lines were designated and 6,430 fleet was assigned. The total fleet of intra-urban and sub-urban bus lines is 10,555 buses. The highest line numbers of 44 lines and the highest fleet of 886 buses are assigned to the zone no. 69, Qatana.

**Table 6.1.2 Sub-urban Bus Lines from/to Damascus Urban Area**

	Zone	Line	Fleet
1-62	Damascus Urban Area	3	0
63	Tall	12	250
64	Sednaya	5	183
65	Rankous	2	0
66	Ein Al-Feejeh	10	165
67	Dimas	5	197
68	Qudsayya	7	251
69	Qatana	44	886
70	Darayya	5	408
71	Suhnaya	2	117
72	Kusweh	13	672
73	Ghuzlanieh	10	12
74	Babbyla	13	481
75	Jaramana	2	245
76	Muleiha	7	143
77	Nashabyyah	14	90
78	Harran Al-Auameed	3	21
79	Kafar Bahna	10	305
80	Arbeen	1	147
81	Harasta	4	147
82	Douma	14	484
83	Dumair	3	86
101	North	0	0
104	South	0	0
105	South-West	17	493
106	West	10	11
	Unknown	25	636
<b>Total</b>		<b>241</b>	<b>6,430</b>

Beside the suburban bus lines, which have their origin/destination within Damascus urban area, 87 lines are designated to operate between villages in the sub-urban area, as shown in Table 6.1.3 in a matrix.

**Table 6.1.3 Sub-urban Bus Lines between Sub-urban Area**

From/To	Zone Name	63	64	66	69	70	71	72	74	77	78	81	82	83	Outside of Study Area	un-known	Total
63	Tall	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	8
69	Qatana	0	0	0	26	0	0	0	0	0	0	0	0	0	1	0	27
70	Daraya	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
71	Suhnaya	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
72	Kusweh	0	0	0	0	0	0	14	0	0	0	0	0	0	2	0	16
74	Babbyla	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
75	Jaramana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77	Nashabyyah	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
82	Douma	0	0	0	0	0	0	1	0	3	0	1	14	1	1	0	21
83	Dumair	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Outside of Study Area		0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	6
Un-known		0	0	0	0	0	0	0	0	0	0	1	2	1	0	38	4
Total		4	4	1	26	1	1	15	3	3	2	2	15	1	9	38	87

## 6.2 Bus Terminals

There are 25 bus terminals in the Damascus urban area, of which 6 terminals are for intra-urban bus services. The location of bus terminals and layouts of representative terminals are given in Figure 6.2.1 and Figure 6.2.2 respectively.

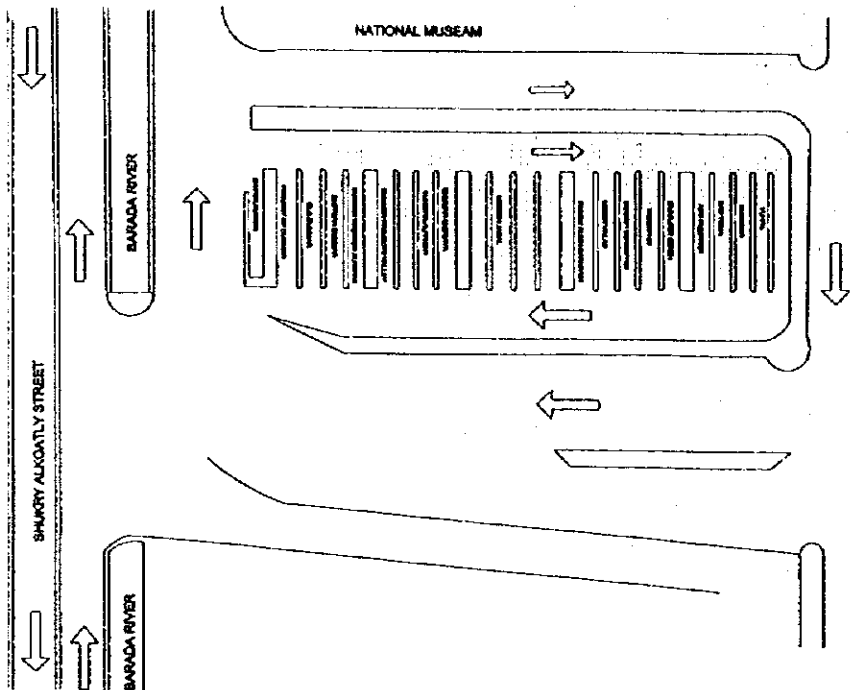
Table 6.2.1 shows the concentration of bus lines and entering/exiting buses at the terminals. Among the terminals served for intra-urban buses, the terminal No. 14 (Karajat terminal) has the highest concentration of about 12,000 buses/day. The other terminals serve mainly for sub-urban lines and for inter-city bus lines as well. Among the intra-urban bus lines, buses on 16 lines are circulating in the city without using the terminal, however they stop at the area surrounding the terminals for passengers. The main function of these terminals is to provide the waiting space for buses. The terminals are operated by public funds, and the bus operators are not charged for use.

**Table 6.2.1 Intra-Urban Bus Terminals**

Terminal No.	Bus Lines	Enter/Exit Buses
5	12	5,254
7	10	6,342
13	11	3,721
14	10	11,944
20	2	1,751
25	1	1,825
No terminal	16	8,686
Total	62	39,523



**Figure 6.2.1 Bus Terminal Locations**



**Figure 6.2.2 President Assad Bridge Terminal Layout**

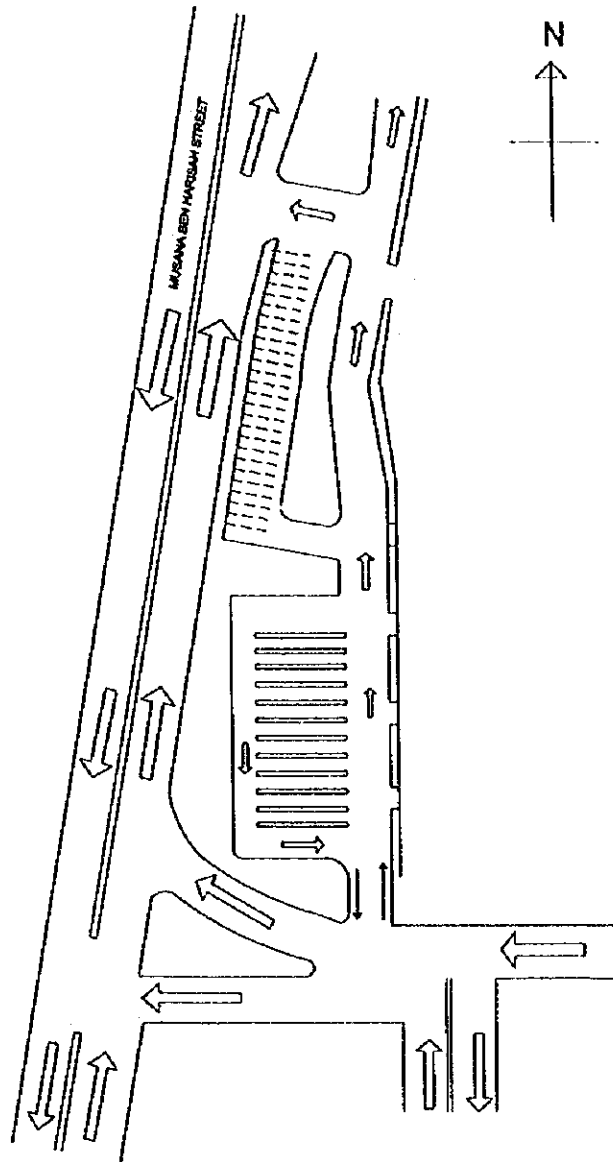


Figure 6.2.3 Al kaboun Terminal Layout



## 6.3 Bus Passenger Survey

### 6.3.1 Survey Items

The purpose of the bus passenger interview survey is to know the reasons why they select a bus line, and under what conditions passengers will shift to another line. In accordance with this purpose, the following items were interviewed to bus passengers. The interview items are classified into Socio-Economic information (SE) and the information on Level of Services (LOS).

#### A. Socio-Economic Information (SE)

- Gender
- Age
- Trip purpose (7 purposes)

#### B. Level of Services (LOS)

- Total line numbers used
- Access distance in meter
- Waiting time for 1st bus in minute
- Waiting condition (with shelter, with bench or nothing)
- Paid fare for the 1st line in SP
- Travel time on board in minute
- Congestion (classified by less than 50%, 50-75% or 75-100%)
- Convenience (good, fair or bad)
- Access distance to the 2nd bus in meter
- Waiting time for 2nd bus in minute
- Waiting condition (with shelter, with bench or nothing)
- Paid fare for the 2nd line in SP
- Travel time on board in minute
- Congestion (classified by less than 50%, 50-75% or 75-100%)
- Convenience (good, fair or bad)
- Access distance to the 3rd bus in meter
- Waiting time for the 3rd bus in minute
- Waiting condition (with shelter, with bench or nothing)
- Paid fare for the 3rd line in SP
- Travel time on board in minute
- Congestion (classified by less than 50%, 50-75% or 75-100%)
- Convenience (good, fair or bad)
- Egress distance in meter

The interview was carried out at the bus terminals and the passengers were interviewed for the bus lines they took and for the alternative bus lines.

### 6.3.2 Basic Statistics

The answered conditions on alternative bus lines are summarized in Table 6.3.1. The highest percentages of 51.6% and 56.2% of the male and female passengers answered that the alternative bus lines will have longer access + egress distance, and about 40% of passengers of the both genders answered that alternative lines will increase on board time and bus fares. The female passengers who answered that the alternative lines will have worse convenience reaches to about 30%.

**Table 6.3.1 Results of Bus Passenger Survey**

Item	Condition on Alternative Route comparing to Present Route							
	Male				Female			
	Decrease	Same	Increase	Total	Decrease	Same	Increase	Total
<b>Sample Numbers</b>								
On board Time	125	238	240	603	39	81	74	194
Fare	122	242	239	603	42	78	74	194
Access Dist	180	112	311	603	48	37	109	194
Waiting Time	133	201	269	603	45	59	90	194
Transfer	32	425	146	603	9	148	37	194
Waiting Condition	33	529	41	603	10	161	23	194
Congestion	37	497	69	603	14	165	15	194
Convenience	67	398	138	603	19	115	60	194
<b>Percent</b>								
On board Time	20.7	39.5	39.8	100.0	20.1	41.8	38.1	100.0
Fare	20.2	40.1	39.6	100.0	21.6	40.2	38.1	100.0
Access Distance	29.9	18.6	51.6	100.0	24.7	19.1	56.2	100.0
Waiting Time	22.1	33.3	44.6	100.0	23.2	30.4	46.4	100.0
Transfer	5.3	70.5	24.2	100.0	4.6	76.3	19.1	100.0
Waiting Condition	5.5	87.7	6.8	100.0	5.2	83.0	11.9	100.0
Congestion	6.1	82.4	11.4	100.0	7.2	85.1	7.7	100.0
Convenience	11.1	66.0	22.9	100.0	9.8	59.3	30.9	100.0

**6.3.3 Effects of Level of Services on Line Selection**

The probability to select a line can be expressed by the following Logit type equation;

$$P_i = \frac{EXP(V_i)}{EXP(V_1) + EXP(V_2)}$$

$$V_i = \sum \beta_k \times Z_k$$

where,  $P_i$ : Probability to select a line No.1

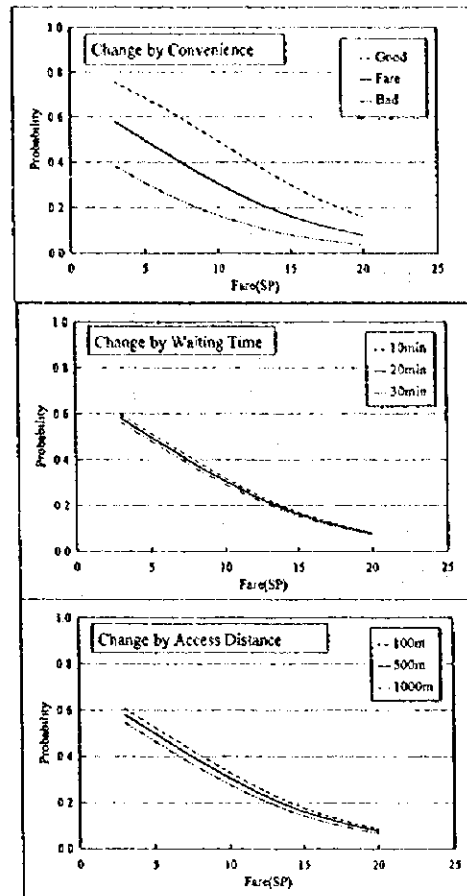
$V_i$ : Utility function

$\beta_k$ : Parameter of variable  $Z_k$

The parameters were calculated by Maximum Likelihood Estimation as shown in Table 6.3.2. The hit ratio to select the present bus line was 0.796.

**Table 6.3.2 Parameters of Disaggregate Model**

Variables	Parameter	t-Value
Total on board time (min.)	0.01243	2.56065
Total fare (SP)	-0.01632	-1.09003
Total access/egress distance (m)	-0.00027	-3.42985
Total waiting time (min.)	-0.00644	-1.15397
Worst convenience	-0.07958	-1.27508



**Figure 6.3.1 Variables Influence on Line Selection**

The effect of variables on line selection was shown in Figure 6.3.1, where the condition of the representative (standard) line was assumed as.

**Assumed Standard Values**

Variables	Assumed Value
Total on board time (min.)	20
Total fare (SP)	5
Total access/egress distance (m)	500
Total waiting time (min.)	20
Worst convenience	2

The effect of the convenience will change the probability more than the change of waiting time or access distance. If the convenience drops in one rank at 5 SP of fare, about 20% of the passengers will take another bus line. The waiting times and on board time will not affect the passenger numbers reflecting the rather small city size at present.

## **6.4 Taxi**

### **6.4.1 Taxi Services**

#### **(1) Service Area**

Service area of the taxis registered in Damascus Governorate is limited inside of the Damascus City including to another cities from Damascus City.

#### **(2) Fleet**

The number of taxis registered in Damascus Governorate was 9,392 units as of February 28th, 1998. Major car models are those of 1983, which is the year when the government imported cars for taxi. Most taxis are small size and 1983 Mitsubishi Lancer is the most common, followed by the Nissan Sunny. Cars with diesel engines are not allowed to use for a taxi.

#### **(3) Fare**

The taxi fare is calculated by the meter and maximum number of passengers is 4. While one passenger is riding it is not allowed to pick up another passenger. Fare system differs by Governorate, and in the case of Damascus it is 3 SP for the first 500 meters, with an additional 1 SP for every 235 meters or 56 seconds.

#### **(4) Taxi Stands**

There are many taxi stands in the city center identified by a road sign. However they are not used efficiently.

#### **(5) Competent Authority**

The Traffic Police Department of Damascus City is the competent authority. Administratively this department belongs to the Ministry of Interior, but in actual day-to-day operation works in close coordination with the Damascus Governorate.

### **6.4.2 Taxi Operators' Attributes**

#### **(1) Owners**

Most taxi owners own one or two taxis only. However, there is no limit to the number of taxis that may be owned by one person.

#### **(2) Common Contract Conditions between Taxi Owner and Driver**

There are two common types of contract between a taxi owner and a driver, as follows;

- **Daily Rent**  
The driver receives 25% of the revenues obtained during the daily operation. Maintenance and fuel costs are covered by the taxi owner. Repair costs are shared by the owner and driver when the driver is to blame.
- **Annual Rent**  
A deposit of 50,000 to 75,000 SP is paid by the driver at the time of signing of a contract. The driver also pays a monthly rent of 11,000 to 15,000 SP. The driver pays all maintenance/repair/fuel costs. The driver keeps all profits made by the taxi operation. At the time of closing the contract the owner returns the deposit to the driver.



# Chapter 7. TRAFFIC MANAGEMENT AND PLANNING

## 7.1 Traffic Management Organization

Two authorities are responsible for traffic management issues in Damascus. One of them is the Traffic Police Department of Damascus City, which is a part of the organization of the Ministry of Interior, and the second is the Traffic Engineering Department under the Damascus Governorate.

### (1) Traffic Police Branch (TPB)

The organizational tasks and responsibilities of the Traffic Police Branch, which is shown in Figure 7.1.1 can be explained as in the following sections.

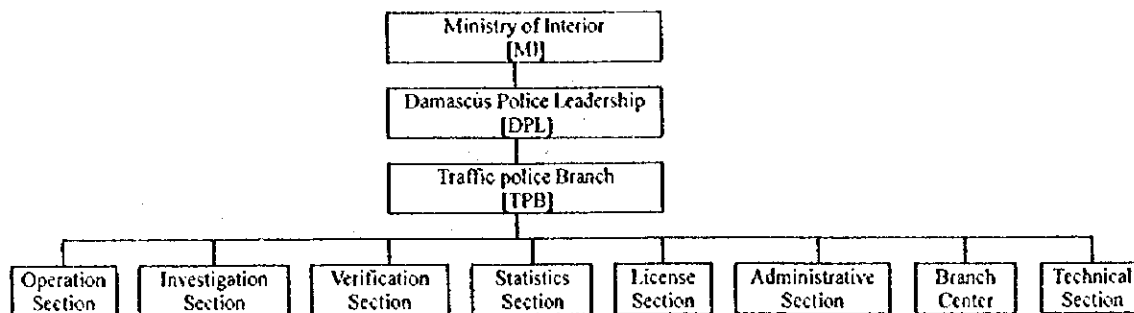


Figure 7.1.1 Traffic Police Management Organization

#### 1) Operation Section

This section is responsible on the traffic management in the City, which is divided into seven zones. Each zone is divided into corridors and intersections supervised by the Traffic Police having a staff of 986 including 32 officers.

#### 2) Investigation Section

This section is responsible on investigations for stolen vehicles and forged number plates or similar cases, with a staff of 36 including one officer.

#### 3) Verification Section

This section has the task of regulating verifications regarding daily accidents. It has a total staff of 79 including one officer and it is equipped with 18 wireless vehicles.

#### 4) Statistics Section

This section is to follow-up vehicle registration at the Transport Department and to supervise computer system operations as well as producing different statistics under a staff of 90 including one officer.

#### 5) License Section

This section, with a staff of 40 including two officers, is responsible for examining applicants for driving license tests and related matters.

## **6) Administrative Section**

This section, with a staff of 32 including two officers, is supervising administrative tasks including the public works and utilities of the ministry.

## **7) Branch Center**

Central affairs, including those of the headquarter, telecommunications, etc. is under the responsibility of this center which has a staff of 28 including one officer.

## **8) Technical Section**

Workshops for maintenance and operation works of equipment, signs and signals are under the responsibility of this section in cooperation with the Governorate. The section has a staff of 10 including one officer.

Moreover, there are 48 vehicles in the headquarter equipped with wireless sets for officers as well as other vehicles and motorcycles for police personnel. Police officers are law university graduates but about 40% of them were transferred from the army with only military education. Other police personnel have only elementary education with less than 10% having preparatory education. There is a need to educationally, academically and socially improve their conditions with comprehensive training on traffic management.

## **(2) Traffic Management Department (TMD)**

### **1) Existing Organization System of TMD**

Based on the Damascus Governor's decree number 104 and dated 1992/4/15 the Traffic Management Department (TMD) was set up in Damascus Governorate. The decree set out the staffing and equipment to be attached to TMD, however the fulfillment of these conditions has yet to be completely made.

### **2) Duties of TMD**

The main duties that the TMD is charged with are as follows;

- Preparation and implementation of different types of traffic studies
- Preparation of technical standards for traffic management and safety equipment as signals, sign and markings
- Supervision and manufacturing of traffic signs and implementation of road marking
- Planning the traffic flow system in the city network, including one-way system, parking regulations, etc.

### **3) Staff of TMD**

The TMD manpower has been set by the Governor's decree but actual staff available is less in number. The following table shows the planned and actual staff by category;

As the table shows the TMD is operating under a severe manpower shortage from that originally planned. The tiles and curbstones workshop has no staff at all. In terms of equipment, TMD also estimates that there is a shortage of 6 pick-ups, 1 passenger car, thermoplastic road marking machine, small generator, welding machine and battery charger.

**Table 7.1.1 TMD Staff**

Staff category	Planned	Actual
1. Manager	1	1
2. Engineers	14	7
3. Traffic Sign Workshop	41	18
4. Road Marking	18	18
5. Tiles and curbstones	4	4
6. Office clerks	4	2
TOTAL	82	46

#### **4) TMD Shortcomings and Development Proposals**

##### **a. Shortcomings**

TMD is the first department of its kind established within the local administrative framework of Syria, and therefore it reflects the government's concern about reinforcing the traffic sector with responsible and technical organization. However TMD has reported the following shortcomings;

- Difficulty in resorting to outside technical assistance, both local and foreign (with the exception of this JICA study)
- Lack of Syrian codes to implement traffic management practices
- Shortage of required vehicles to transport workers and materials
- Shortage of road marking vehicles and lack of new modern vehicles
- Shortage of automation and computer equipment for data storage, analysis and preparing studies
- Shortage of plotters, printers and cutters at the traffic marking and signs workshops
- Shortage of experienced manpower due to low wages offered

##### **b. Development Proposals**

TMD considers the following steps are necessary in order to improve the TMD.

- Making comprehensive plans for covering existing shortage and provision of the minimum requirements
- Providing the technical experts, in addition to the required equipment for developing department activity in the field of traffic management and organization

#### **7.2 Driving License System**

Driving licenses are divided into the following:

1. Motorcycle license.
2. Private license for small passenger cars and private trucks to 3,500 kg
3. General license for small cars.
4. General license for all kinds of vehicles including buses, trucks, etc.
5. License for service and agricultural vehicles
6. License for the disabled

The age of the applicants

- 18 years old for the items 1, 2, and 5
- 20 years old for the other items



The applicants should pass medical examination and technical test at TPB to confirm their ability to drive, their understanding of traffic regulations and their ability to read and write. The driving license is renewed every 8 years for people under 60 years of age and every 4 years for those above 60 years.

### 7.3 Vehicle Registration System

All types of vehicles should be registered in the Transport Department and should be technically tested when registered for the first time, or if any modification applied on the specifications, or at re-registering if it had been stopped for more than one year. In addition, there is a periodical test every 2 years for passenger cars and every 1 year for public transport cars and trucks and temporary-entrance cars. The test is carried out at the Transport Department by specialized committee to decide the ability to operate and according to that test, the owner of the vehicle is given a license of vehicle validity after providing the following information: identification card, residence place, the working area of his vehicle, custom certificate, receipt of duties payment, vehicle insurance certificate and technical test result.

The maximum total weight of vehicles is decided as follows:

Two axle vehicle	19 Ton
More than two axle vehicle	26 Ton
Trailer	30 Ton, if the trailer is 2 axle: 19 Ton 35 Ton, if the trailer is more than 2 axle: 26 Ton

The maximum dimensions of the vehicles should be as follows:

Total width:	2.5 m.
Length of 2-axle vehicle:	11 m
Length of trailer:	14 m
Length of trailer and its containers:	18 m

### 7.4 Traffic Regulations

Traffic regulations are supposed to be strictly applied and in case of violation by any driver, penalties will be imposed on violators based on the type of violation. The heaviest penalties are those for accidents causing physical harm in which a jail term for up to one year is applied, in addition to paying an amount of 1,000 – 2,000 SP. For such accidents, the suspension of driving license is also imposed for a period of 3 -12 months. Other violations with jail terms include driving before obtaining a license, driving without number plate, drunken driving or violating the transport tariff system. Payments for penalties range from the maximum of 2,000 SP to the minimum of 25 SP for light violations. In total, the traffic violation code includes 80 different types of violations.

### 7.5 Traffic Planning Organization

There are no studies or plans to manage the traffic in Damascus, and all related subjects are discussed and approved by the Main Traffic Committee. Executing traffic plans, including construction of streets, squares, and other facilities, is a part of the urban master plan and all the regulations are applied on it, but the sub-committee is responsible for approving of microbus routes or modifying them or constructing bus stops.

Two authorities are responsible for traffic management issues in Damascus. One of them is the Traffic Police Department of Damascus City, which is a part of the organization of the

Ministry of Interior, and the second is the Traffic Engineering Department under the Damascus Governorate.

## **7.6 Intersection Traffic Volume**

A traffic count survey has been implemented at selected intersections considered to be important. The results of survey are shown in Table 7.6.1. Importance was evaluated based on the following functions.

- ① A point for inflow traffic to the city from inter-city arterial roads (interchange).
- ② A principal intersection on a suburban arterial road.
  1. Arterial road - arterial road.
  2. Arterial road - minor road.
- ③ A principal intersection on the ring road which ties the outside circumference of the city area.
  1. An intersection with a radial road.
  2. Others.
- ④ An intersection in the city central area.
  1. Arterial road - arterial road.
  2. Arterial road - minor road.

The intersections classified based on the above functions are shown in Figure 7.6.1 They may be further categorized as follows:

- 1) Intersections serving mainly as interchanges at important points for inflow traffic to the city, such as intersections No. 21, No. 39, No. 42, and No. 49 which are points where long distance traffic converges.
- 2) Mainly rotary intersections, as No. 19, No. 22, No. 35, and No. 43 which are points linking the urban parts of the city and where the demand is high.
- 3) Intersections which link the ring road to the city center, of which intersections with radial roads are very important in the implementation of the traffic count survey.
- 4) Intersections, which link the city center, are vital in particular those on arterial road because of the important role they have in mitigating traffic congestion in the CBD.

Since road markings are not clear at the intersections, vehicles are not regulated by approaches. This results in conflict and a fall in traffic capacity. In the rotary intersections where traffic volumes are low traffic flow is smooth, however conflicts are very much in evidence in intersections where traffic volumes are high such as intersections No. 6, No. 8, No. 9, and No.11 resulting in severe traffic congestion.

Based on the existing data, intersections where bottlenecks are significant are as follows;

- Hasan Al Kharat Square (No.11)
- El Shiekh Raslan Square (No.13)
- Bilal Square (No.15)
- Ath Thawra St. - Murshed Khater St. Intersection (No.59)
- Al Ittihad St. - Ath Thawra St. Intersection (No.61)
- Naser St. - Ath Thawra St. Intersection (No.62)
- Jihad Square (No.64)
- Sana Agency Intersection (No.65)
- As Sabaa Bahrat Square (No.74)
- Hijaz Square (No.79)

Table 7.6.1 Summary of Intersection Traffic Volume

Intersection Title	In-flow Traffic Volume			
	Small	M-Bus	Large-B	Total
1 Umawiyeen Square	106,159	22,928	4,104	133,191
Vehicle Type Ratio	80	17	3	100%
2 Sheraton Crossroads	69,762	32,490	3,960	106,212
Vehicle Type Ratio	66	31	4	100%
3 Jamark Square	37,896	27,240	2,766	67,902
Vehicle Type Ratio	56	40	4	100%
4 Ali Ben Taleb's St/ M Ben Omair St	14,382	17,340	612	32,334
Vehicle Type Ratio	44	54	2	100%
5 A Baker Al-Saddik St/ 17th of April St	38,724	15,414	3,150	57,288
Vehicle Type Ratio	68	27	5	100%
6 Dawar Kafar Susseh Square (Qana)	54,499	31,570	3,402	89,471
Vehicle Type Ratio	61	35	4	100%
7 Al Ba'ath Square	87,786	47,214	6,804	141,804
Vehicle Type Ratio	62	33	5	100%
8 Al-Mujtahed St/ Khalid Ben Al-Waleed St	44,526	36,728	2,550	83,804
Vehicle Type Ratio	53	44	3	100%
9 Al-Yrmouk Square (Bab Mussalla)	62,598	23,720	2,310	88,628
Vehicle Type Ratio	71	27	3	100%
10 Interior Transportation Establishment	46,852	21,666	3,942	72,460
Vehicle Type Ratio	65	30	5	100%
11 Hassan Al-Kharat Sq (Airport Sq)	66,060	22,191	10,332	98,583
Vehicle Type Ratio	67	23	10	100%
12 Bab Sharki Intersection	79,076	26,488	11,760	117,324
Vehicle Type Ratio	67	23	10	100%
13 Sheikh Raslan Square	145,896	50,370	22,480	218,746
Vehicle Type Ratio	67	23	10	100%
14 Bab Touma Square	37,080	5,544	936	43,560
Vehicle Type Ratio	85	13	2	100%
15 Azzablatani (Bilal) Square	64,992	29,526	11,940	106,458
Vehicle Type Ratio	61	28	11	100%
16 French Hospital Intersection	25,278	3,360	1,050	29,688
Vehicle Type Ratio	85	11	4	100%
17 Al-Abbassiyeen Square	58,113	30,402	10,002	98,517
Vehicle Type Ratio	59	31	10	100%
18 Al-Abbassiyeen Complex	29,192	9,240	2,635	41,067
Vehicle Type Ratio	71	22	6	100%
19 Al-Karajat (Terminal Sta) Sq	42,984	31,320	11,226	85,530
Vehicle Type Ratio	50	37	13	100%
20 Pullman Stations Intersection	19,140	12,906	2,988	35,034
Vehicle Type Ratio	55	37	9	100%
21 Al-Kaboun Crossroads	75,901	41,298	15,306	132,505
Vehicle Type Ratio	57	31	12	100%
22 Al-Shurta College Int In Barzeh	38,212	18,924	5,256	62,392
Vehicle Type Ratio	61	30	8	100%
23 Tichreen Hospital Sq In Barzeh	26,414	9,252	3,668	39,334
Vehicle Type Ratio	67	24	9	100%
24 M Barzeh St/ run-to-Iben Anffis St	37,086	12,648	2,100	51,834
Vehicle Type Ratio	72	24	4	100%
25 Athawra St/ Iben Anaffis St	45,246	15,546	2,539	63,331
Vehicle Type Ratio	71	25	4	100%
26 Athawra St/ K Bent Al-Azouar St	44,694	6,804	2,088	53,586
Vehicle Type Ratio	83	13	4	100%
27 Hitteen Square	55,602	12,618	1,983	70,203
Vehicle Type Ratio	79	18	3	100%
28 Bader Addin Al-Ghazali Square	45,312	11,882	1,348	58,542
Vehicle Type Ratio	77	20	2	100%
29 O Al-Abrash (Al-Jesser Al-Abyad) Sq	38,742	10,716	1,224	50,682
Vehicle Type Ratio	76	21	2	100%
30 Rawdet Abi Al-Ah'a Square	34,539	5,315	990	40,844
Vehicle Type Ratio	85	13	2	100%

(Continued)

31 Shora Intersection	20,856	15,384	2,682	38,922
Vehicle Type Ratio	54	40	7	100%
32 Tichreen Square	13,530	9,810	1,596	24,936
Vehicle Type Ratio	54	39	6	100%
33 Thi Kar Square	30,188	9,826	1,056	41,070
Vehicle Type Ratio	74	24	3	100%
34 Tichreen Bridge (Arrabwa Conjunction)	34,650	11,988	2,394	49,032
Vehicle Type Ratio	71	24	5	100%
35 T Assawari Sq (Al-Muwasa Hospital Sq)	31,209	14,724	1,942	47,875
Vehicle Type Ratio	65	31	4	100%
36 Al-Mashfa Al-Askari S/ Sheikh Sa'ad St	23,256	11,106	1,152	35,514
Vehicle Type Ratio	65	31	3	100%
37 Fayez Mansour S/ 17th of April St	89,806	25,719	5,322	120,847
Vehicle Type Ratio	74	21	4	100%
38 Military Housing Establishment's	60,108	19,218	2,214	81,540
Vehicle Type Ratio	74	24	3	100%
39 F Mansour S/ President Assad St	39,329	15,342	5,334	60,005
Vehicle Type Ratio	66	26	9	100%
40 Intersection of Daraya	12,770	3,594	1,614	17,978
Vehicle Type Ratio	71	20	9	100%
41 President Assad S/ Daraya Br	23,082	6,523	3,810	33,415
Vehicle Type Ratio	69	20	11	100%
42 Al-Meedan Crossroads	98,364	24,504	12,588	135,456
Vehicle Type Ratio	73	18	9	100%
43 Al-Bawabeh Intersection	39,888	24,258	5,862	70,008
Vehicle Type Ratio	57	35	8	100%
44 Kadam-Sebeinch Intersection	26,802	15,012	4,242	46,056
Vehicle Type Ratio	58	33	9	100%
45 Athalatheen Square	48,882	20,208	5,208	74,298
Vehicle Type Ratio	66	27	7	100%
46 Azzahera Intersection	38,214	8,862	4,338	51,414
Vehicle Type Ratio	74	17	8	100%
47 Furn Azzahera Intersection	42,846	11,562	4,302	58,710
Vehicle Type Ratio	73	20	7	100%
48 Azzahera Crossroads	72,904	22,317	15,958	111,179
Vehicle Type Ratio	66	20	14	100%
49 Airport Highway Crossroads	55,470	16,914	16,422	88,806
Vehicle Type Ratio	62	19	18	100%
50 Badawi S/ Bab Al-Jabich St	29,652	1,278	810	31,740
Vehicle Type Ratio	93	4	3	100%
51 Attarceer Square	56,370	10,101	2,394	68,865
Vehicle Type Ratio	82	15	3	100%
52 Aleppo S/ Murshed Khater St	52,464	11,238	1,464	65,166
Vehicle Type Ratio	81	17	2	100%
53 Koumish Attijarah/ 6th of Tichreen St	32,226	7,494	1,866	41,586
Vehicle Type Ratio	77	18	4	100%
54 Al-Kassour Square	19,882	3,606	396	23,884
Vehicle Type Ratio	83	15	2	100%
55 Al-Hilal Al-Ahmar Al-Souri St	40,314	8,148	1,338	49,800
Vehicle Type Ratio	81	16	3	100%
56 Murshed Khater Int (Al-Massyra)	30,685	8,256	864	39,805
Vehicle Type Ratio	77	21	2	100%
57 Baghdad St - Dte of Education	33,612	5,838	1,508	40,958
Vehicle Type Ratio	82	14	4	100%
58 Russian Embassy Intersection	107,178	27,402	6,594	141,174
Vehicle Type Ratio	76	19	5	100%
59 Athawra S/ Murshed Khater St	125,026	25,050	5,136	155,212
Vehicle Type Ratio	81	16	3	100%
60 Athawra S/ Baghdad St	74,094	14,178	1,866	90,138
Vehicle Type Ratio	82	16	2	100%
61 Athawra S/ Al-Itihad St	120,966	29,223	5,080	155,269
Vehicle Type Ratio	78	19	3	100%
62 Athawra S/ Annasser St	69,867	6,726	2,898	79,491
Vehicle Type Ratio	88	8	4	100%

(Continued)

63 Damascus Police Center	39,884	3,468	2,328	45,680
Vehicle Type Ratio	87	8	5	100%
64 Al-Jihad Square	65,440	24,900	3,282	93,622
Vehicle Type Ratio	70	27	4	100%
65 Sana Agency Intersection	49,824	28,713	1,621	80,158
Vehicle Type Ratio	62	36	2	100%
66 University Hall Intersection	12,184	8,838	450	21,472
Vehicle Type Ratio	57	41	2	100%
67 Al-Diyafeh Palace Square	43,980	13,704	960	58,644
Vehicle Type Ratio	75	23	2	100%
68 Al-Jala'a St/ Al-Muhdi Bin Barakeh St	43,590	8,628	762	52,980
Vehicle Type Ratio	82	16	1	100%
69 Saudi Arabia Embassi Intersection	26,142	4,254	240	30,636
Vehicle Type Ratio	85	14	1	100%
70 Arnous Square	64,218	9,822	1,440	75,480
Vehicle Type Ratio	85	13	2	100%
71 Al-Shahbandar Square	48,594	8,970	978	58,542
Vehicle Type Ratio	83	15	2	100%
72 Ein Jallout Square	35,794	1,668	1,284	38,746
Vehicle Type Ratio	92	4	3	100%
73 Zaki Al-Mahasni (Al-Iman Mosque) Sq	60,354	2,092	1,326	63,772
Vehicle Type Ratio	95	3	2	100%
74 Al-Sabe' Bahrat Square	59,404	9,252	1,704	70,360
Vehicle Type Ratio	84	13	2	100%
75 Al-aabed St/ Parliament St	20,418	3,552	528	24,498
Vehicle Type Ratio	83	14	2	100%
76 Damascus City Governorate Sq	47,821	7,002	1,488	56,311
Vehicle Type Ratio	85	12	3	100%
77 Ashuhada (Al-Marjeh) Square	23,754	1,182	744	25,680
Vehicle Type Ratio	93	5	3	100%
78 Victoria Bridge	90,066	20,724	3,305	114,095
Vehicle Type Ratio	79	18	3	100%
79 Al-Hijaz Square	43,086	8,160	1,644	52,890
Vehicle Type Ratio	81	15	3	100%
80 At Tajhiz Downward Street	23,692	684	468	24,844
Vehicle Type Ratio	95	3	2	100%
81 Kabbani-Kassem Intersection	30,282	6,102	820	37,204
Vehicle Type Ratio	81	16	2	100%
82 Omayyad Hotel Intersection	18,060	528	174	18,762
Vehicle Type Ratio	96	3	1	100%
83 Dar Assalam Secondary School	36,120	1,056	348	37,524
Vehicle Type Ratio	96	3	1	100%
84 Krash Intersection	9,858	18,120	1,548	29,526
Vehicle Type Ratio	33	61	5	100%
85 Ibrahim Hanano Intersection	34,800	8,352	1,626	44,778
Vehicle Type Ratio	78	19	4	100%
86 Al Ashmar Square	27,262	26,454	2,784	56,500
Vehicle Type Ratio	48	47	5	100%