

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION (CDR)
REPUBLIC OF LEBANON

THE STUDY
OF
ENVIRONMENTAL FRIENDLY INTEGRATED
TRANSPORTATION PLAN
FOR
GREATER TRIPOLI

FINAL REPORT

TECHNICAL REPORT - 3

PUBLIC TRANSPORT PLAN

DECEMBER 2001

KATAHIRA & ENGINEERS INTERNATIONAL

REPORT COMPOSITION

The Final Report of the Study is structured to meet the requirements of each user-group. It contains an executive summary, two main reports and six technical reports as follows:

EXECUTIVE SUMMARY: is designed to address the decision-makers as ministers and politicians who do not need deep information in technical and engineering aspects. It contains brief information on all the aspects of the Study and concentrates on the input and output of each aspect. It has also a more concentrated summary for the main conclusions in two pages.

MAIN REPORT – 1 “Integrated Transport Plan”: is designed for planners and directors of CDR and concerned ministries and authorities, who need more technical information on the Master Plan formulation. It contains applied planning policies, development and evaluation of alternatives, main information on the plan of each sector, evaluation results of the Master Plan and the overall implementation plan.

MAIN REPORT - 2 “Short-term Improvement Plan”: integrates more detailed studies and information on the urgent projects included under the Short-term Improvement Plan. The report gives the necessity, objectives, preliminary design, cost estimate and project evaluation on the technical, environmental and economic viability of each project.

TECHNICAL REPORT - 1 “Traffic Analysis and Forecast”: is basically prepared for technology transfer purposes. It addresses transport planners and contains the forecast procedures of forecasting future transport demand. The procedure starts with traffic surveys and analysis, socioeconomic framework, trip generation and attraction and the future transport demand.

TECHNICAL REPORT - 2 “Road Network Plan”: is for the specialists in the road planning and network development. It includes the present road network pattern as well as the planning concept and strategies, which are the basis of the proposed network pattern. Projects of the developed plan are prioritized for implementation under each of the planning periods.

TECHNICAL REPORT - 3 “Public Transport Plan”: is for the specialists in the public transport sector and schemes planned under the Master Plan. It includes the estimated future demand, proposed routes, required number of buses and cost estimation in addition to the implementation plan. It includes also plans and measures for taxi service and school buses.

TECHNICAL REPORT - 4 “Traffic Management”: is for the specialists in the traffic management sector and projects included under the Master Plan. It demonstrates the problems under existing conditions and the formulated plan that includes different procedures and measures for traffic signalization, parking control as well as safety and education measures.

TECHNICAL REPORT - 5 “Environmental Assessment”: gives the environmental conditions and initial environmental examination for the Study Area. Through an environmental impact study, it highlights the environmental issue in establishing the urban transport plan in order to emphasize the importance of preserving and improving the environment.

TECHNICAL REPORT - 6 “Project Management and Financing”: is addressing the administrative issues that will affect the successful implementation of the planned projects. It includes the present legislation, organization and funding system of agencies that will implement the projects under the Study. For the successful implementation of the projects as scheduled, management and financing plans are presented.

APPENDIX

TECHNICAL REPORT - 3
Table of Contents

	<u>Page</u>
CHAPTER 1 EXISTING PUBLIC TRANSPORT SYSTEM.....	1-1
1.1 BUS TRANSPORT	1-1
1.1.1 City Buses	1-1
1.1.2 Intercity Bus Public Transport	1-2
1.2 TAXI TRANSPORT	1-4
1.3 RAILWAY TRANSPORT	1-5
1.4 SEA TRANSPORT.....	1-6
1.5 AIR TRANSPORT	1-7
1.6 EXISTING PROBLEMS.....	1-8
CHAPTER 2 PUBLIC TRANSPORT DEVELOPMENT PLAN.....	2-9
2.1 PLANNING CONCEPTS.....	2-9
2.1.1 Public Transport Development Objectives	2-9
2.1.2 Public Transport Development Strategy	2-9
2.2 PLANNING ALTERNATIVES.....	2-9
CHAPTER 3 BUS PLAN.....	3-9
3.1 CITY BUS	3-12
3.1.1 Demand Forecast.....	3-12
3.1.2 City Bus Route Network and Bus Operation Plan.....	3-12
3.1.3 City Bus Terminal.....	3-13
3.1.4 Measures to Increase the Bus Users	3-14
3.1.5 Assessment of City Bus Plan Based on Other City.....	3-17
3.3 INTERCITY BUSES	3-18
CHAPTER 4 TAXI PLAN.....	4-20
4.1 CITY TAXI	4-20
4.2 INTERCITY TAXI	4-20
CHAPTER 5 SCHOOL TRANSPORT	5-22
5.1 DEMAND FORECAST.....	5-22
5.2 SCHOOL TRANSPORT PLAN.....	5-22
CHAPTER 6 COST AND IMPLEMENTATION PLAN.....	5-24

List of Tables

		<u>Page</u>
Table 1.1-1	Proposed Bus Routes by the French Study	1-1
Table 1.1-2	Proposed Numbers of Buses by the French Study	1-1
Table 1.1-3	Revised City Bus Routes by the ORRPT	1-2
Table 1.2-1	Existing Distribution of Taxi Terminals	1-5
Table 1.4-1	Import and Export Quantities in Tripoli Port.....	1-7
Table 1.4-2	Number of Served Vessels in Tripoli Port.....	1-7
Table 3.1-1	Requirements of Public Transport City Bus Demand.....	3-13
Table 3.1-2	City Terminal.....	3-13
Table 3.1-3	Bus Route Operation Lengths	3-13
Table 3.1-4	Bus Service in Major Egyptian Governorates.....	3-17
Table 3.1-5	Similarities between Tripoli and Suez Cities	3-17
Table 3.2-1	Intercity Terminals.....	3-19
Table 4.1-1	Forecast of City Taxi Demand.....	4-20
Table 4.1-2	Required Number of City Taxi Stalls in the City and Intercity Terminals	4-20
Table 4.2-1	Required Number of Intercity Taxi Stalls.....	4-21
Table 5.1-1	Current and Future School Bus Requirements	5-22
Table 6.1-1	Cost and Implementation Plan.....	6-24

List of Figures

		<u>Page</u>
Figure 1.1-1	Proposed Lines for Tripoli City Bus Routes by the French Study.....	1-3
Figure 1.1-2	Existing Locations of Public Transport Terminals by the Field Survey.....	1-3
Figure 1.1-3	Proposed Regional Intercity Bus Route by ORRPT.....	1-5
Figure 2.2-1	Public Transport Scheme	2-11
Figure 3.1-1	Densities of Public transport Trip-Ends	3-14
Figure 3.1-2	Scenario of City Bus Routes	3-15
Figure 3.1-3	Bus Terminals and Taxi Stands	3-15
Figure 3.1-4	Typical Alignments of Bus Stops near to the Intersection.....	3-16
Figure 3.1-5	Population and Bus Fleet in Different Governorates.....	3-18
Figure 5.1-1	Location of Schools	5-23

LIST OF ABBREVIATIONS

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Traffic
B/C	Benefit-Cost Ratio
BOT	Built, Operate and Transfer
CAS	Central Administration of Statistics
CBD	Central Business District
CDR	Council for Development and Reconstruction
CEGP	Council Executive des Grand's Projects
CNG	Compressed Natural Gas
CO	Carbon Monoxide
COM	Council of Ministers
DGHB	Directorate General of Highways and Buildings
DOR	Directorate of Road
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
ERM	Environmental Resource Management
EU	European Union
FAR	Floor Area Ratio
FHWA	Federal Highway Administration
FYDP	Five Year Development Plan
GDP	Gross Domestic Products
GNP	Gross National Products
GOJ	Government of Japan
GOL	Government of Lebanon
HC	Hydrocarbon
HCM	Highway Capacity Manual
IBRD	International Bank for Reconstruction and Development
IEE	Initial Environmental Examination
ISF	Internal Security Force
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
LL	Lebanon Lira, Lebanon Pound
LOS	Level of Service
LRT	Light Railway Track
MEA	Middle East Airlines
M/P	Master Plan
MOE	Ministry of Environment
MOF	Ministry of Foreign Affairs
MOMRA	Ministry of Municipal and Ruler Affairs
MOI	Minister of Interior
MOPWT	Ministry of Public Works and Transport

MPWT	Ministry of Public Works and Transportation
NAC	Noise Abatement Criteria
NERP	National Emergency Reconstruction Program
NGOs	National Governmental Organizations
NO	Nitrogen Dioxide
NPV	Net Present Value
OD	Origin-Distention
ODA	Official Development Assistance
O & M	Operation and Management
ORRPT	Office of Rail Road & Public Transport
PCE	Passenger Car Equivalent
PCU	Passenger Car Unit
PDR	Plan Dimension Ratio
PIU	Project Implementation Unit
PMT	Project Management Team
RC	Reinforced Concrete
RER	Real Estate Registry
ROW	Right of Way
STRADA	JICA System for Traffic Demand Analysis
TCC	Technical Coordination Committee
TSP	Total Suspended Particulate
TTC	Travel Time Cost
UNICEF	United Nation Children's Fund
USEPA	United State Environmental Protection Agency
V/C	Volume-Capacity Ratio
VOC	Vehicle Operating Cost
WHO	World Health Organization
WTW	Water Treatment Works

CHAPTER 1

EXISTING PUBLIC TRANSPORT SYSTEM

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1.1 BUS TRANSPORT

1.1.1 City Buses

The survey for the city buses in Greater Tripoli shows that recently this service is not existed. Taxi and service taxi are the major modes of the city public transportation. School buses have a recognizable share concerning the student trips.

There is only one official public transport authority in Lebanon. This authority office is located in Beirut. The official authority office has the name "Office of Rail, Road & Public Transport" and it comes under the supervision of the Ministry of Public Work and Transportation.

Office of Rail Road & Public Transport has a decision taken in 15 of August 2000 to provide a public city bus transport services in Tripoli and its surrounding municipalities. The plan is depended on the study carried out by a French consultant for North Lebanon (Mission D'Expertise Sur Les Transports Au Nord Liban, Jan. 1995) and supported by French fund. The study proposed four lines to provide the city bus public transport services for the cities of Tripoli, El-Mina and Zgharta as well as near extensions occupied by considerable passengers. The proposed lines are shown in Table 1.1-1.

Table 1.1-1 Proposed Bus Routes by the French Study

Line No.	Route
1	El-Mina – El-Qoubbe
2	El-Mina – Abou Samra
3	Ras-Maska – El-Bedaoui
4	Zgharta – Serail

The proposed timetable is:

- First departure at every terminal: 6:30
- Last departure at every terminal: 18:30

The proposed frequency is:

- 10 minutes in peak hours and 15 minutes in off-peak hours for the El-Mina – El-Qoubbe and El-Mina – Abou Samra lines
- 20 minutes throughout the day for the Ras-Maska – El-Bedaoui and Zgharta – Serail lines

The number of buses to meet the aforementioned frequencies estimated as shown in Table 1.1-2.

Table 1.1-2 Proposed Numbers of Buses by the French Study

Route	Number of Buses
El-Mina – El-Qoubbe	16 buses
El-Mina – Abou Samra	13 buses
Ras-Maska – El-Bedaoui	7 buses
Zgharta – Serail	7 buses

The Rail Road and Public Transport Office revised the abovementioned plan. The revised plan that includes 5 lines as shown in Table 1.1-3 is proposed. Finally, in the implementation stage the lines numbers 1, 2, 3 and 13 are included in the implementation plan. The Office of Rail Road and Public Transport mentioned that there is 22 minibuses each with 25 seats capacity are reserved for this implementation plan of Tripoli City public transport services. The authority plan is to start the service by the coming June 2001. Figure 1.1-1 shows the bus routes of these revised lines.

Table 1.1-3 Revised City Bus Routes by the ORRPT

Line Number	From	To
1	Mai Elyas	El-Qoubbe
2	Behsass	Dair Amaar
3	Mari Elyas	Abou Samra
8	Sahet El-Nour	Cheka
13	El-Qoubbe	Bab El-Ramal

1.1.2 Intercity Bus Public Transport

(a) Existing Conditions

Regarding intercity public transport, buses are running from Tripoli to Beirut and some other major cities in North Lebanon as well as major cities of Syria. However, private sector takes the responsibility regarding these modes of intercity transportation. The main terminals are located at the city center of Tripoli near to Sahet El-Taal (Gamal Abd El-Nasser Square). The main location is shown in Figure 1.1-2 (location number 2). There is no reasonable geometric planning for this terminal. The timetable for the buses is also not fixed. Mini-buses with about 25 seats and large-buses with about 50 seats are on services. The fare from Tripoli to Beirut is about 1000 to 2500 LL. The major four private companies and their routes are:

- | | |
|-------------------------------------|--|
| 1) Transtour / Bikaai Abr El-Shark: | Tripoli – Homs, Hama and Aleppo
Tripoli – Homs, Damascus
Tripoli – El-Ryad
Tripoli – UAE (Dubai and El-Aain)
Tripoli – Qatar and Bahrain |
| 2) Tripoli Express: | Tripoli – Beirut |
| 3) Abyad Company: | Tripoli – Beirut |
| 4) El-Ahdab: | Tripoli – Beirut |

(b) On-going Proposed Implementation

An implementation of intercity bus services by Office of Rail Road and Public Transport was carried out. It will serve all cities and principal valleys of the North Region.

It is composed of “scheduled lines”. There will be several bus services during the day on the main connections where passengers are recognized. On other connections, the service will be reduced to one inbound trip towards Tripoli in the morning (arrival to Tripoli around 7:30), and one outbound trip in the evening (departure from Tripoli around 16:30). It is evident that some connections, given the smaller number of passengers, do not justify a public transport service.

The proposed regional network is as shown in Figure 1.1-3. It is composed of:

- Four regular daily lines services between Tripoli and main cities of the region Aleppo, Amioun, Sir & Batroun. (*red lines*)
- Direct lines that ensure one, even two daily round trips between Tripoli & Bcharre, Berqayel, Dinbou. (*blue lines*)
- Lines that correspond with the four regular lines and make possible to serve less populated areas and remote areas further away from Tripoli. (*green*)
- Build a Bus Terminal in the south of Tripoli and it may be looks like the one constructed in Beirut (Sharal El-Helou)

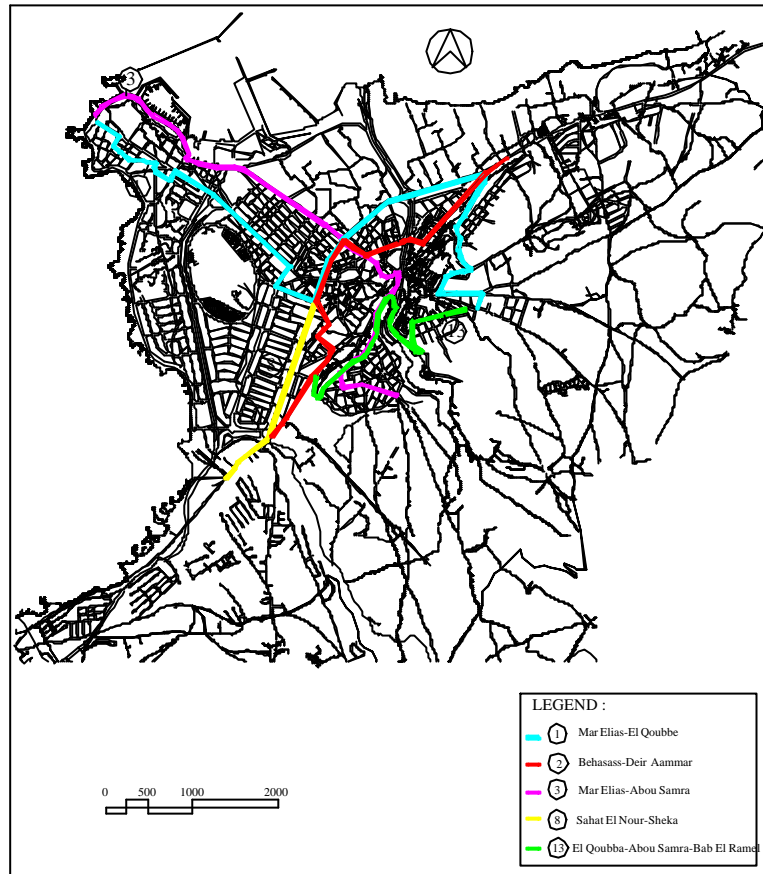


Figure 1.1-1 Proposed Lines for Tripoli City Bus Routes by the French Study

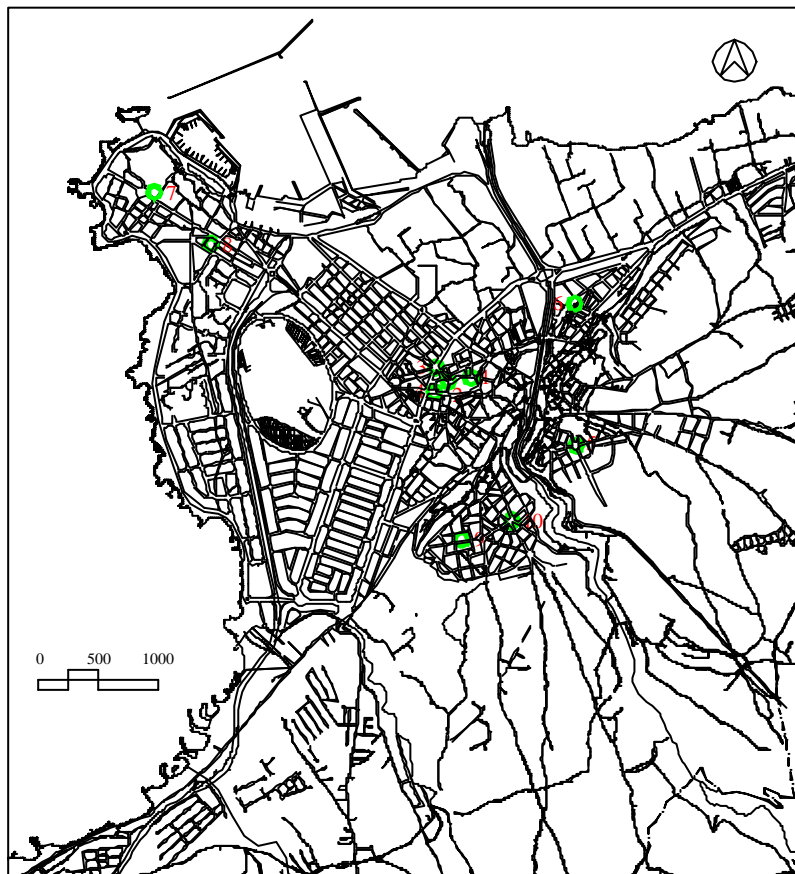


Figure 1.1-2 Existing Locations of Public Transport Terminals by the Field Survey

However and depending on the consultation with the authority it is not clear when this implementation will be started. Officials mentioned that the start of intercity bus services would be depended on the opening of the intercity terminal.

1.2 TAXI TRANSPORT

Taxi and private cars are the main modes of transportation not only in Greater Tripoli but also in all of Lebanon cities.

There is no limitation on the entrance of the taxi coming from different origins including the Syrian ones to the CBD of Tripoli. There is no distinguishing between the taxi of Tripoli and those of other cities. In Lebanon all taxi regardless, the city name has a red plate number. Therefore, there are huge numbers of taxi coming to the city center and in the same time; there are no reasonable legal terminals for these taxi. They have to park in a random way with double and some time triple rows blocking the streets on the face of through traffic.

The tariff from Tripoli to El-Mina is about 1000 LL. This cost for a distance of about 2 Km in length is almost one-quarter the price from Tripoli to Beirut of 85 Km in length. Service taxi almost follow a pre-set route and stop wherever and whenever the passengers want. Payment is usually standard charge and can be made at any time during the trip, though most people tend to pay when they get in. If the passenger destination is not straightforward, he or she may have to take more than one service taxi. If there are no other passengers in the car, it is advisable that the passenger inquires if it is a service taxi before getting in unless he or she may be charged a higher rate of taxi fare. That is because the same service taxi can become a taxi if the passenger pays the fare of the other seats.

Taximeters are not in used in all vehicles all over Lebanon. The charge is a matter of negotiation between passenger and driver. Recently, a very limited numbers of new models taxi becomes in operating on Beirut city.

One issue regarding the service taxi fare seems to be illogical and difficult to understand. If the passenger ride the taxi from the terminal he or she has to pay only 500 LL while if he or she ride the taxi outside the terminal has to pay 1000 LL even the distance he or she will ride can be shorter one. The explanation for this phenomenon is that the 500 LL is considered by drivers as quite cheap fare and to make the profit more reasonable for them, it becomes double once the taxi move outside the terminal. Furthermore, the driver prefers to wait inside the terminal until the car has full occupancy. Officials mentioned that to encourage the driver to move outside the terminal with 50% or 75% occupancy, one way is to makes the fare double outside the terminal. The gasoline charge is about 750 LL (0.5 US\$)/one liter. This rate is enforcing the drivers to do not move with their cars to pickup the passengers outside the terminals.

For city taxi there are places known to be terminals, even all of these locations have no geometric planning or any taxi stands. These locations are distributed in main municipalities as shown in Table 1.2-1. All of these locations were surveyed by the Study Team and assigned in the location map as shown in Figure 1.1-2.

Regarding city and intercity taxies there is no distinguished. The same taxi can come as a city or intercity one. Passenger can ask the taxi driver to take him to any city once they have agreement about the fare.

The service taxi share the buses in the same tasks to take the passengers to Beirut and other major cities. Almost these service taxi are of old modals. There is no rules for taxi stopping and they are parking near to the intercity buses in hazard way. A limited capacity up to four passengers was decided but all taxi carry at least five passengers. This is due to the shortage of the enforcement and desire of drivers to get more benefits regardless the convenient of passengers.

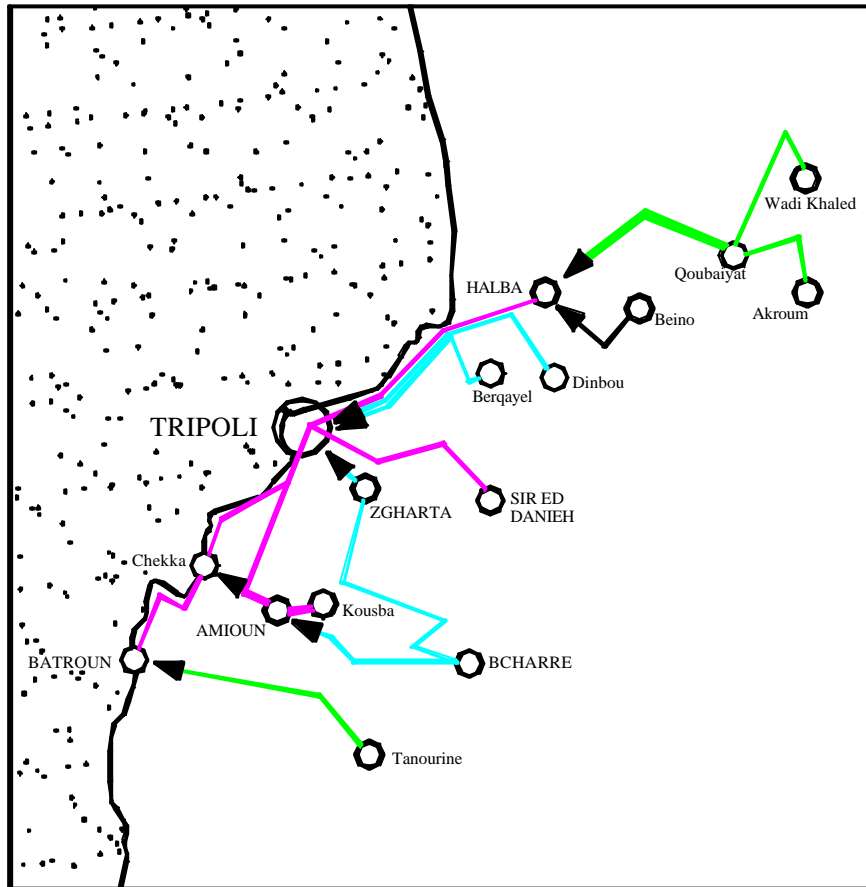


Figure 1.1-3 Proposed Regional Intercity Bus Route by ORRPT

Table 1.2-1 Existing Distribution of Taxi Terminals

Location	Number of Terminals	Terminals No.	Capacity of Terminal
Old City and City Center	4	1	15-20
		2	70-80
		3	30-40
		4	20-25
El-Qoubbe	1	5	15-20
El-Tebana	1	6	10-15
El-Mina	2	7	5-10
		8	5-10
Abou Samra	2	9	5-10
		10	5-10

The intercity terminal is located same place of intercity bus terminal at Sahet El-Taal. (Location No. 2 in Figure 1.1-2). The allowed parking spaces are very limited and therefore the taxi are parking randomly all around this area. Completely, planning is not exiting for the intercity terminal.

1.3 RAILWAY TRANSPORT

Currently, there is no railway service in all over of Lebanon. However, before the Civil War railway services owned by the government was available that connected Beirut with Tripoli and Damascus. The track of this railway is still existed with its right-of-way in some locations and missed in many other locations. The station in Tripoli is also still existed even it is almost destroyed.

The investigation and consulting with authorities in charge especially Office of Rail Road and Public Transport and Municipality of Tripoli show that it is almost impossible to re-build the old railway

track between Tripoli and Beirut because almost the right of way was missed. On the other hand, consulting with the authority of Tripoli Port shows that the linking of the port with Beirut and other cities can activate the share of this port in the future. The Port authority mentioned that for the future requirements of economical activities it may be needed to consider this project.

The Port Authority mentioned also that the linking of the Tripoli Port and Greater Tripoli with the Syrian railways would help in the economic activities in the coming future. In this regard the authority mentioned that the construction of the rail connection between Tripoli and Syria it may be more visible rather than the connection between Tripoli and Beirut.

Regarding the on-going projects, there is nothing on the time being. However, there are some studies by different consultants were carried out but there is no feasibility study for any of these studies yet. These projects include the following:

- Light Railway Track (LRT), but it is only just an idea without any implementation yet.
- Rebuild the railway line between Jonia and Tripoli. A study was carried out without a feasibility assessment.

1.4 SEA TRANSPORT

Beirut, Tripoli and Sidon are the major ports, and the main port in Northern Lebanon is Tripoli Port. This port history goes back to 1960. It is a small one due to the limited draft. After 15 years of war, the Lebanese government put a plan to revive the most important sites of the country and on the priorities was the Tripoli port. Recently, the port has a draft of 8 m and quay-length of 1000 m.

The port is deal with ships for both import and export for Northern Area and some neighbor areas.

During, 1975 ~ 1992 many ships handling were recognized because during the civil war there was no contact between Beirut and Tripoli. Importing was carried out directly to Tripoli.

In 1996, some improvements were carried out such as lifting up submerged ships, and some infrastructure projects.

Recently, the biggest improvement project is ongoing. The projects consist of two stages.

In the first stage, the following improvements will be carried out:

Draft at Canal Entry will be increased to -11m

Draft along Quay-Length will be increased to -10m

In the second stage, the following improvements will be done:

Draft for Canal Entry will be increased to -13m

Draft along Quay –Length will be increased to -12m, -11m & -10m

The first stage is to be executed by Feb. 2001. According to the implemented plan, by June/July 2001 the second stage will be completed. After the completion of the project, the port area will be 300,000 square meters. After the first Stage, 350,000 square meters will be add to the free zone area. That means the total area of the free zone will be 600,000 square meters.

Regarding the import/export activities, Table 1.4-1 shows the import and export quantities handled in the port during the last years relative to 1977 & 1978.

Table 1.4-2 shows the number of vessels served in Tripoli Port in the last four years. The data for year 2000 is up to August only. By the end of the year 2000, it is expected that the figure will be considerable bigger than the one of the year 1999. All the data mentioned here are obtained from the port authority office.

Table 1.4-1 Import and Export Quantities in Tripoli Port

Year	Total of Import/Export
1977	583,000 ton
1978	686,000 ton
1999	715,000 ton
Up to Aug. 2000	425,000 ton

Table 1.4-2 Number of Served Vessels in Tripoli Port

Year	No. of Vessels
1997	408
1998	490
1999	540
2000 up to Aug.	290

The port officials mentioned that the applied tax could be considered less than the one applied in Beirut. They mentioned also that the port financial is a Self-Financial but comes under the supervision of the Ministry of Transport. The Financial Plan after settled by management authority, is submitted to City Office, Minister of Transport, and Minister of Financial Affairs. The current Master Plan required a fund estimated as 100,000,000 US\$.

The port authority thinks that after the ongoing projects will be conducted in the near future it will be expected that the port will be able to receive the medium size ships. The port has the advantage that it is working all the year around. It is the most near one to the neighbor country that has no exit to the Mediterranean Sea. Furthermore, roadway transport is available easily through Homs to Baghdad in addition to its proximity to Kleyaat Airport that it may be renovated and modernized to become a first class airport.

The most common materials handled within the port are all kind of woods, sugar, cars, used cars, steel, tiles and alabaster. For the time being the port not deal with passenger.

Regarding other ports, there is a small one in Chekka for cement, and it is located about 17 km from Tripoli. There is another one in Salatah for chemical products, and it has more deep draft depth than Tripoli port now. After the completion of the current improvement projects, the Tripoli port will have more depth as the port authority mentioned.

The port authority also thinks that there are no roadway problems now. The port is well connected to the express highway. The port authority is concern about the easy contact with neighbor countries. The authority think that, railway (30km) may be needed in future to make contact with the Syrian Railway.

1.5 AIR TRANSPORT

There is no airport within or near to Greater Tripoli boundaries except Kleyaat Airport which is located 20 kilometers to the north but used only for the military purpose. CDR officials mentioned that a plan is under consideration to rebuild this airport to becomes as first class one. However, it is not clear if there is a need for such plan in the time being or in the near future. This is may be due to the short distance from Beirut to Tripoli of about 85 km. The short distance makes the importance of upgrading this airport especially for Tripoli area is not so recognizable. It might be in the few coming years the Beirut Airport can be considered within the reasonable distance regarding to Tripoli and its surrounding cities. On the other hand, the requirements of economic and touristic activities may be in too much need to rebuild and upgrade this Kleyaat Airport.

Beirut has an international airport. The national carrier is Middle East Airlines (MEA), and it operates flights to most European capitals, the Middle East, Africa, Singapore and Australia. Currently, there is no domestic air service within Lebanon.

1.6 EXISTING PROBLEMS

Throughout the investigation of the existing conditions related to public transport, services and facilities the following main problems can be concluded.

(1) City Buses

- Currently, there is no city bus service. City buses can reduce the number of trips by other transport modes that have limited passenger capacity like private cars and taxi. The decrease in the number of these other modes will reduce the traffic volumes that can have good impact concerning environment.
- Official authority is located in Beirut; there is no local official authority in Tripoli. The existing of official authority in Tripoli can support more efficiently the public bus services in Greater Tripoli.
- There is no enough fund resource for the city bus plan implementation. This fund resource has to be considered to improve the public transport facilities in the city and consequently the environment condition.

(2) Intercity Buses

- The current services managed only by the private sector. Some destination may be not interested for the private sector in the short term planning but it may be needed for the future development planning. Involvement of the governmental sector can support such long-term planning requirements.
- The existing terminal can be classified exposed of the engineering standard. The terminal does not have the enough capacity and facilities. The location of the terminal in the center of the city creates heavy demand and bad environment condition. Relocate the terminal outside the city center can solve many traffic and environment problems.
- There is no fixed timetable or schedule for bus arrival or departure. The passengers have to go to the terminal and wait looking for the buses departure. On the other hand, buses sometime have to wait for the passenger arrivals that make bus-waiting time inside the terminal too long. This long time waiting is against the good environmental condition especially the drivers keep the bus engine running while they are waiting for the passenger.

(3) City Taxis

- There are no sufficient terminals and the capacities of the existing ones are not enough.
- All of the existing taxi are very old models. Performance is doubtful and exhaust is environmental harmful.
- There are no taxi stands. Stopping of taxi create significant delay for the through traffic. Management of taxi stopping will improve the environmental state by reducing the travel delay times.

(4) Intercity Taxi

- The existing terminals are insufficient and out of the geometrical standard.
- The existing taxi are very old models. Performance is doubtful and exhaust is environmental harmful.

(5) School Buses

- There are no parking stalls for the school buses. The buses have to park in the front of the schools and consequently block the street. Delay for through traffic is recognizable. The delay in trip times is always against the environment.
- The fleet of the school buses include many large buses that make the bus traveling speed too low and the maneuver capability very limited. Since the bus have to go through the narrow streets to gather the students, it crates a sever bottleneck with every stopping. As mentioned before, this delay is very harmful for the city environment. Sever air pollution is always related to exhausts of vehicles.

CHAPTER 2

PUBLIC TRANSPORT DEVELOPMENT PLAN

CHAPTER 2

PUBLIC TRANSPORT DEVELOPMENT PLAN

2.1 PLANNING CONCEPTS

The survey of the existing conditions shows that there is no public transport city bus service within the study area. However, as official mentioned there is a plan to operate a city public transport bus service in the coming few months. In the time being, all the public city trips are carrying out by taxis, service taxis and school buses. Intercity trips are carrying out by the private companies buses and intercity shared taxis.

For both city and inter-city, recognizable insufficient facilities regarding bus terminals and taxi stands are reported.

School trips are distributed among three modes of transport that is school bus, sheared taxi and private car. School buses are one of the major reasons of heavy traffic congestion during the morning and evening peak hours. The impact of repeated stopping and especially of large buses of about 50 seats on the road capacities is quite recognizable. The parking of buses in front of schools with the parking of sheared taxi and private cars at almost the same time is a bottleneck on the roads where these schools are located.

Considering these characteristics, the following planning objectives and targets are formulated:

2.1.1 Public Transport Development Objectives

The objectives of the public transport development are:

- To introduce a modern and environmental friendly city bus system to met the future socio-economic development in Tripoli and to decrease private car use dependency rate.
- To improve the shared-taxi service as supplement to city and inter-city bus in order to achieve an efficient public transport system.
- To improve the school bus service also as supplement to bus system to achieve an efficient and safe public transport system.

2.1.2 Public Transport Development Strategy

In order to achieve the objectives mentioned-above, the strategy prepared is as follows:

- Introduction of a modern city bus system
- Provision of optimum bus routes to meet public transport demand
- Provision of transport demand control measures to prioritize public transport system among transport modes
- Integration between city bus network and inter-city one
- Providing bus terminals to promote integration with other modes
- Establishment of taxi terminals and stops to promote bus usage

2.2 PLANNING ALTERNATIVES

(1) Planning Alternatives

Five public transport-planning schemes have been investigated and evaluated to select the best alternative. Main characteristics of the selected scheme are based on the construction of new Central

City Parking Terminal and two Intercity Terminals. Intercity bus loading/unloading and intercity taxi loading will be made at the new terminals. Intercity taxi unloading will be at passenger destinations. City taxi loading/unloading can be done at the central parking terminals. Figure 2.2-1 shows the planning alternatives including the Designated Terminal System (2) which is the planned public transport scheme.

Among these five (5) alternatives, Plan C is evaluated to selected the optimum alternatives. The optimum bus transport system is selected and indicated as follows:

- Introduction of a city bus transport service in addition to existing inter-city bus service.
- Inter-city buses would be loaded and unloaded at the north and south bus terminals, but not at the central area.
- Within Tripoli Metropolitan area, the public transport will be serviced as city bus services.
- Taxi services are divided into two (2) types for inter-city taxi service and city taxi service separately.
- Inter-city taxi would be loaded and unloaded, as same as bus system, at north and south bus terminals, not at the central area.

(2) Significance of City Bus Services

- The bus systems are one of the most flexible and easiest development transport systems and it can be even introduced into a small-scale urban area.
- It can operate in the existing road system of densely populated CBD under the condition still to pay to limit the expansion of road services.
- It does not need any significant changes to the existing road system.
- It is indispensable to introduce an appropriate transport system to connect the major urban areas of Greater Tripoli.
- Public transport system with its small initial investment cost can coincide with the financial inadequacy of the Municipalities within the study area. Bus system needs limited initial investment supplies.
- The system is compatible with the future increase of population.
- The system will persuade the utilization of the new developed areas and decrease the high population density in the current congested areas.
- Furthermore, there is some bus systems have environmentally friendly impact that can be used in future.

		PLAN A	PLAN B	PLAN C	PLAN C
	Present System	Improvement of Present System (Short Term Measure)	Designated Terminal System (1) (Medium Term Measure)	Designated Terminal System (2) (Medium Term Measure)	Taxi Area Service System (Medium Term Measures)
Schematic Diagram					
System	<ul style="list-style-type: none"> - Intercity Bus: Loading and unloading at the city center, parking on a road. - City Bus: Are not yet in service. - Inter City Taxi: Unloading almost at passenger's final destination and loading almost at city center. - City Taxi: There is no classification between city and intercity taxi, that means city taxi can move from inside and outside the city boundary. 	<ul style="list-style-type: none"> - Intercity Bus: Loading and unloading at designated bus terminal. - City Bus: Connect the city center with the designated bus/taxi terminals and other city destinations. - Inter City Taxi: Unloading at passenger's destination and loading at city center terminal. - City Taxi: Loading from the city center, unloading at passenger's destination and also can go outside the city boundary. - Provision of designated bus terminal. 	<ul style="list-style-type: none"> - Intercity Bus: Loading and unloading at the new terminal. - City Bus: Connect the different city origins and destinations with the terminal locations. - Inter City Taxi: Unloading at passenger's destination and loading at the city park terminal. - City Taxi: Loading at the city park terminal and unloading at passenger's destination, connect the city park terminal with the new terminal and can also go outside the city boundary. - Construction of a new terminal. 	<ul style="list-style-type: none"> - Intercity Bus: Loading and unloading at the new terminal. - City Bus: Connect the different city origins and destinations with the terminal locations. - Inter City Taxi: Unloading at the passenger's destination and loading at the new terminal. - City Taxi: Loading and unloading can be at the city park terminal and also connect the city park terminal with the new terminal and also go outside the boundary of the city. - Construction of a new terminal. 	<ul style="list-style-type: none"> - Intercity Bus: Loading and unloading at the new terminal. - City Bus: Loading and unloading at origins and destinations and connect the city park terminal with the new terminal. - Inter City Taxi: Loading and unloading only at the new terminal and not allowed to enter the city boundary. - City Taxi: Move only within the city boundary and can make loading and unloading at the city park terminal and new terminal. - Construction of new terminal.
Advantage	<ul style="list-style-type: none"> - Very convenient and comfortable for the passengers, but hampering social activities and city environment. 	<ul style="list-style-type: none"> - Mitigate the congested traffic condition at the city center because of designated bus terminals. - Intercity bus will not enter to the city center that can improve the congested traffic condition at the city center. 	<ul style="list-style-type: none"> - Intercity bus will load / unload at a new terminal therefore, bus congestion at city center will be mitigated. 	<ul style="list-style-type: none"> - Congestion at the city park terminal will be minimized , because inter city taxi can not load at city park terminal. 	<ul style="list-style-type: none"> - Recognizable improvement in the reduction of traffic congestion at the city center.
Disadvantage	<ul style="list-style-type: none"> - There is no functional classification of the city intercity taxi/bus. - There is not enough parking space at the city center and city park terminal which are over congested. - Taxi waits for a long time since the number of passenger is few. (taxi service supply is greater than passenger demand). 	<ul style="list-style-type: none"> - Almost same as the current condition unless the following measures will be implemented: <ul style="list-style-type: none"> • Commencement of city bus services. • Enforcement of recommended traffic regulation. • Traffic flow improvement especially near the old city. • Intersection improvement including traffic flow and geometry. 	<ul style="list-style-type: none"> - Congestion at city park terminal may be almost remain as present system unless the recommended measures will be implemented. - Recommended measures same as " Improvement of present system. 	<ul style="list-style-type: none"> - City taxi shall be distinguished with city ID card to park at city park terminal. - Enforcement to prohibit intercity taxi from loading at the city park terminal. 	<ul style="list-style-type: none"> - Difficult to define the city boundary limits because administrative legislation on service area of taxi is required to be determined at national level. - Difficult to prohibit a city taxi to go out of, and an inter city taxi to go in the city boundary.
Evaluation	Not acceptable in terms of hampered social activities and city environment.	Practical as short term measure with recommended measures.	Not acceptable as medium term measure because of congestion at city park terminal.	Practical.	Not implementable because of required legislation at national level.

Figure 2.2-1 Public Transport Scheme

CHAPTER 3

BUS PLAN

CHAPTER 3

BUS PLAN

3.1 CITY BUS

3.1.1 Demand Forecast

The existing and future land use within the study area was investigated. The currently population for each zone within the study area and the future ones were estimated.

The recent labor distribution, the recent distribution of the student and the recent number of university student are analyzed. The forecasting regarding the employment, students and the economic parameters in Lebanon are also considered.

The traffic composition representing the condition inside and outside the city were obtained from the traffic survey data of cordon and screen line surveys.

With these data plus the results of the public transport survey, the public transport current and future demands forecast were carried out for the different public transport modes.

Table 3.1-1 shows the results of the city bus demands. The estimation described in this table depends in the following assumptions:

- The mini-bus with seat capacity equal to 25 passengers will be used for public buses. This assumption was made because the road conditions in Greater Tripoli cannot accommodate large buses. The use of the mini-buses will release the road congestion, insure high bus occupancy rate and will have higher operating speed and maneuver capability.
- High occupancy of bus is considered and bus will makes a round trip within one hour. This assumption is considered to increase the feasibility of the bus services. Considering the boundaries of the study area, the area is not too large and the bus can make the round trip within one-hour limit.
- The time interval between the bus arrivals to the station is 10 minutes. This assumption is necessary for the success of the implementation since it is expected that the passengers will dislike waiting for more than 10 minutes.
- Buses daily trips are concentrated within 14 hours from 6:30 to 20:30.
- As a target, the share of public transport city buses among the public transport modes is considered as 20% by the year 2005, and around 30% to 40% by the year 2020. The assumption depended in the priorities that will be given to the city buses public transport services.
- As another target the share of public transport including both taxi and buses concerning the other transport mode by the year 2010 is 45% and will be 50% by the year 2020. Currently the share is about 36% divided between school buses and service taxi. The ratio of school buses is about 10% and 26% is the ratio of the service taxi. As the priority will be given to the public transport city buses, this assumption can be achieved.

3.1.2 City Bus Route Network and Bus Operation Plan

The most important is to select the most reliable bus routes to provide the best service to passengers and at the same time to acquire the reasonable profits from the high occupancy rate.

To achieve these targets, the collected data from the public transport interview survey was investigated. Due to the absent of city buses, the analyses have to be depended on the collected data about the service taxi (shared taxi). Based on these data, the density of the public transport trip ends is estimated and presented graphically as can be shown in Figure 3.1-1.

Table 3.1-1 Requirements of Public Transport City Bus Demand

Year	2001	2005	2010	2020
Population	330,930	360,304	390,447	454,174
Active Population	200,000	233,000	265,000	339,000
Trips/Day	600,000	699,000	795,000	1,017,000
% of Public Transport	36	40	45	50
Public Transport Trips/Day	216,000	280,000	358,000	508,000
% of Public Buses	0	20	30	40
Public Buses Trips/Day	0	60,000	110,000	200,000
Estimated No. of Required Buses	0	85	150	285

As can be noticed, the city center is the major location for both generated and attracted trips. The figure shows also that the other main areas are El-Qoubbe, El-Mina, El-Bedaoui and Abou Samra.

The results obtained from the investigation of the public transport survey are coinciding with the results obtained for the population density, land use and active population distribution.

Therefore, it is steadfast to include the city center in the different routes to achieve reasonable occupancy rate. The other highlighted main areas are the main origins and destinations for public transport services. The proposed routes must connect these main areas of generated and attracted trips with the city center and with each others. A reasonable scenario that can serve the areas characterized by a high demand is presented in Figure 3.1-2.

In this scenario, two phases are considered. The first phase includes the two lines that will have the high priority based on the high demand analysis. Then, after the success of the implementation of phase one, the second phase can be implemented. The reason to consider two phases is to give the authority the enough time to prepare the required fund resources for the implementation of the whole service. As can be seen from Table 3.1-1 that for the implementation of the public transport services about 85 mini-buses are required up to the year 2005. Currently and as mentioned, by the authority they have reserved only about 22 mini-buses for Tripoli Public Transport city bus service. This limited number cannot be even use for the implementation of only one bus route.

3.1.3 City Bus Terminal

Due to the high demand in the city center, implementation of a city terminal is needed. The proposed location is presented in Figure 3.1-3. This location can be planned at or near to Sahet El-Taal (Gamal Abd El-Nasser Square).

The terminal will serve the mini-buses and it may also serve the service taxi at the same time. The estimated reasonable capacity is described in Table 3.1-2.

Table 3.1-2 City Terminal

Year	2005	2010	2020
No. of Bus Stalls	4	8	12

Table 3.1-3 shows the expected operation length for the implemented four bus routes. As can be noticed the operation length is around 13 km that means if the average bus traveling speed is about 20-30 km/hr, this operation length can be covered in less than 30 min. that coincide with the assumption that the mini-bus can make a round-trip within one hour.

Table 3.1-3 Bus Route Operation Lengths

Bus Route No.	Operation Length
1	12.5
2	9.0
3	12.0
4	12.5

3.1.4 Measures to Increase the Bus Users

Priority for public transport should be considered. Giving the public city buses the priority can insure the success of the implementation. Traffic management can give the required priority for the public bus services. In this respect some or all of the following can be adopted:

- Bus exclusive lane
- Bus priority lane

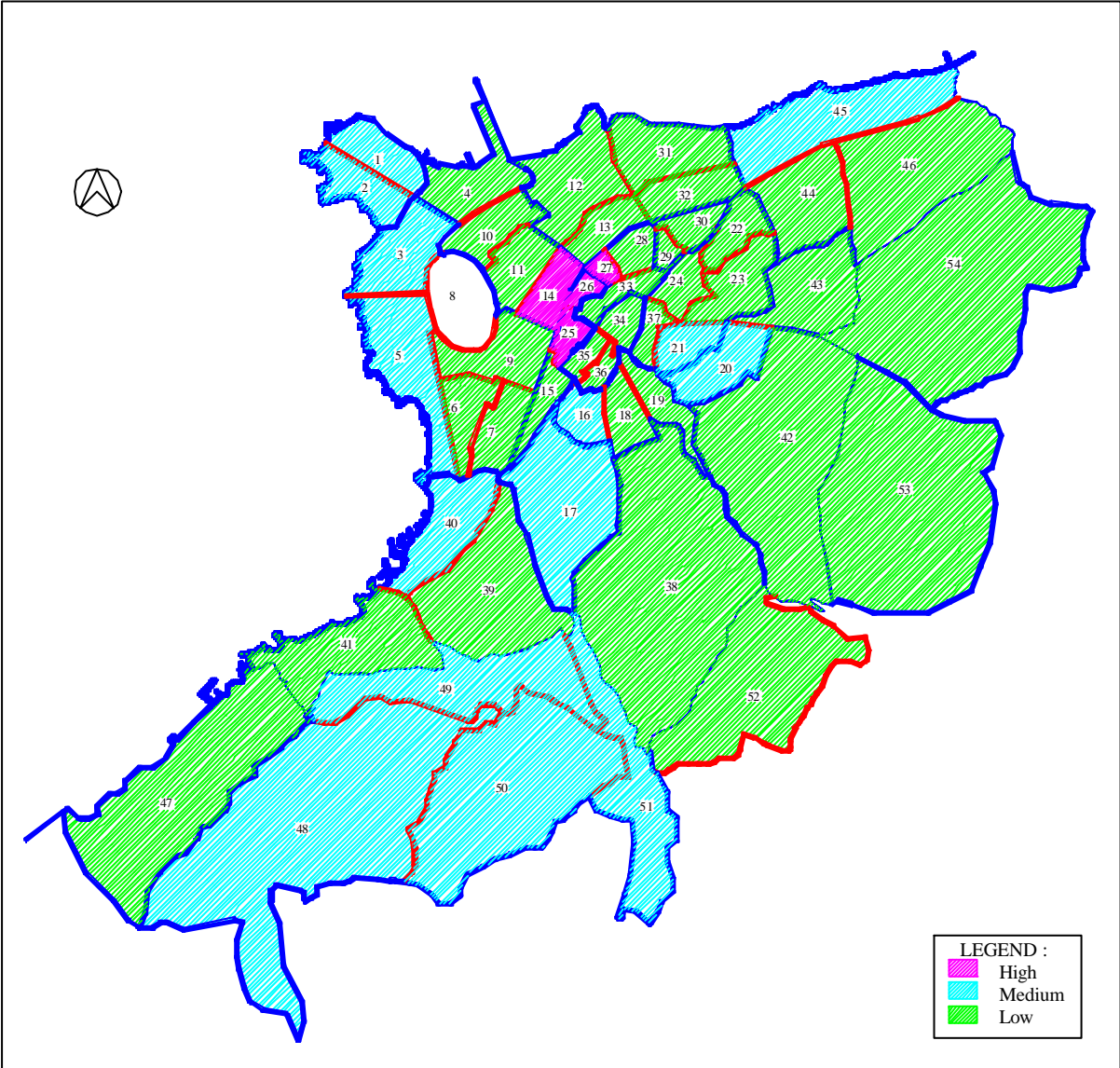


Figure 3.1-1 Densities of Public Transport Trip-Ends

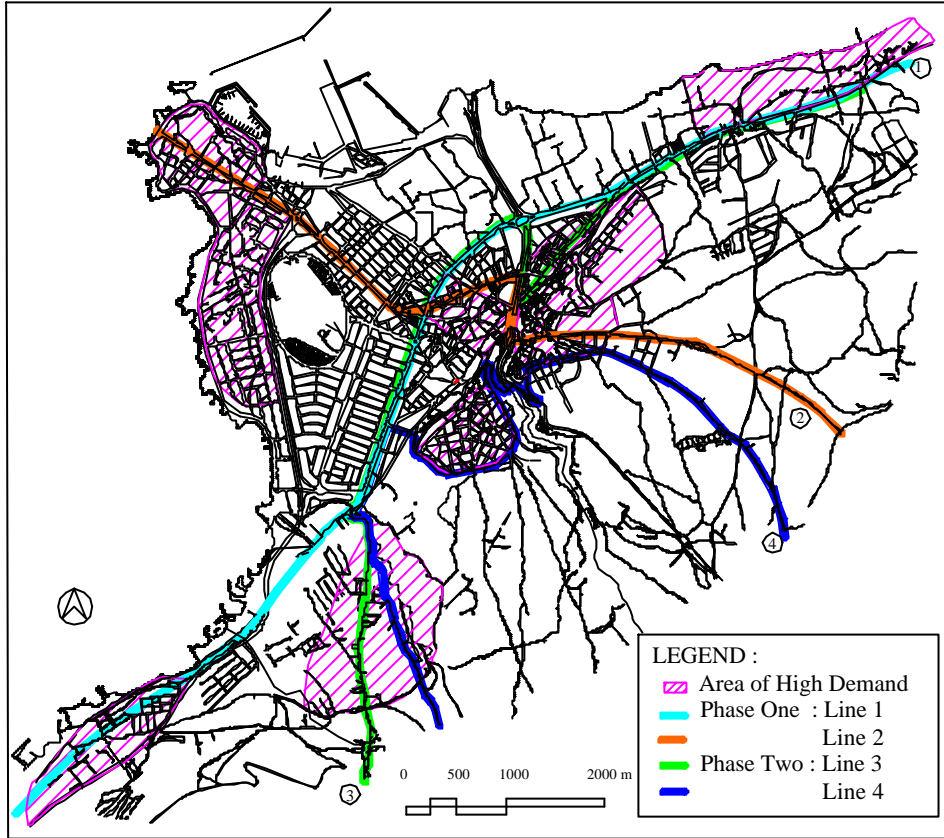


Figure 3.1-2 Scenario of City Bus Routes

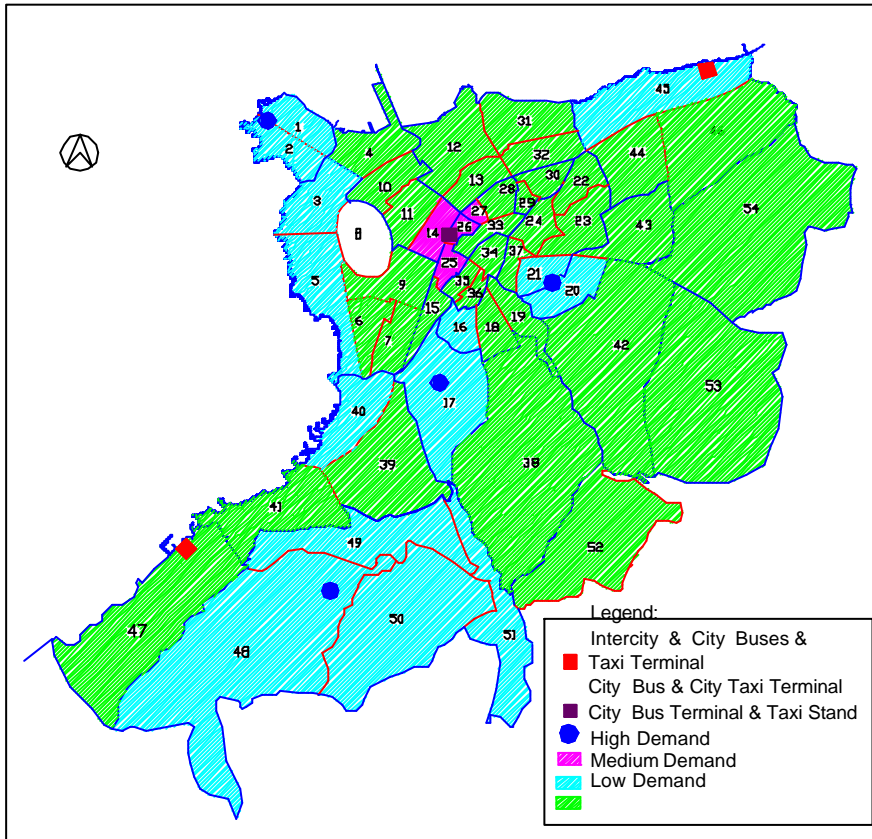


Figure 3.1-3 Bus Terminals and Taxi Stands

- Bus priority signal
- Bus exclusive right turn/left turn lane
- Reversible lane
- Short time interval between buses
- Reasonable walking distance
- Ban the entering of private car to the CBD area
- Comfort transfer system with other mode especially intercity buses
- Strongly ban illegal parking at bus stops
- Reasonable fare; and in this regard and based on the current fee of the service taxi, a 500 LL can be considered as a reasonable fee for the first feasibility analyses. The fare sure can be revised in the feasibility study and can be revised in future after the first phase implementation.
- Standard design for the bus stops; examples are given in Figure 3.1-4. In these example four cases of bus stops near to the intersection, which covers the different alignment probabilities are clarified.

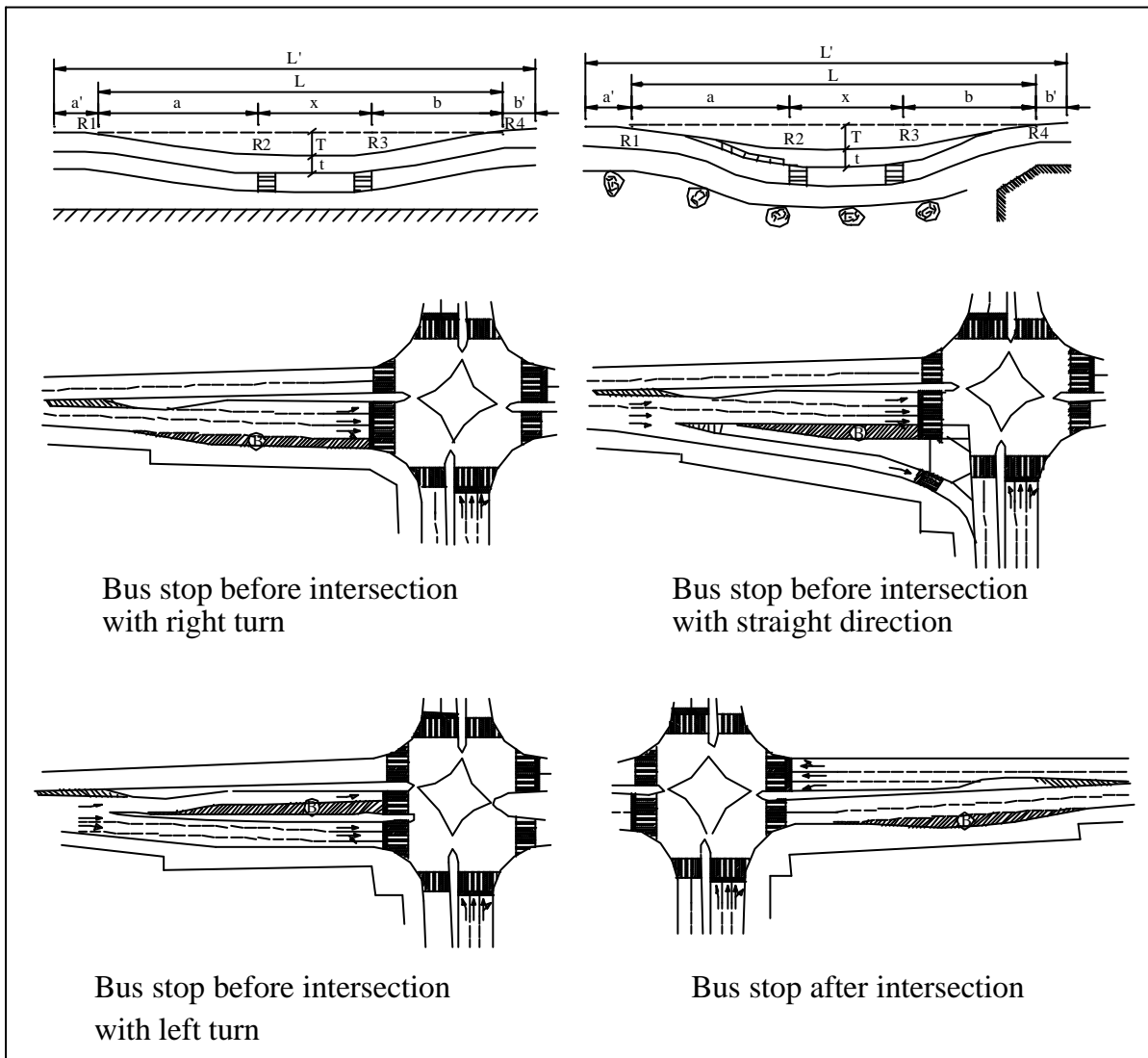


Figure 3.1-4 Typical Alignments of Bus Stops near to the Intersection

3.1.5 Assessment of City Bus Plan Based on Other City

Recently in Lebanon, the city bus service is only available in Beirut. However, Beirut cannot be considered as a similar city for Tripoli due to the great difference in population and land uses. Looking for a similar city also has to consider the social background of the city. Therefore, a similar city within the Middle East Area is required. In this respect, Egypt is found as one of the most nearest country that also have almost the same social characteristics of Lebanon since the both are classified as Arab Countries. Furthermore, the city bus service is available in Egypt since long time ago back to early 1940s. The data on bus services in Egyptian cities are collected from “The Statistical Year Book 1992-1998” by the Egyptian Central Agency for Public Mobilization & Statistics and Governmental Internet Home Page (www.highway.idsc.gov.eg/govern). The data shows that the city bus service is existed in 10 cities out of the capital cities of 26 Governorates, as presented in Table 3.1-4.

Table 3.1-4 Bus Service in Major Egyptian Governorates

Governorate	Population	Bus Fleet	Operated Buses	Efficiency Rate %	No. of Employees	Congestion Rate
Cairo	6,800,992	9,554	3,945	83	41,905	4.2
Alexandria	3,339,076	1,222	388	64	10,202	1.8
Suez	472,335	76	29	76	152	2.8
Kafr-El-Sheikh	2,223,659	180	87	97	365	1.5
Gharbia	3,406,020	902	318	71	3,147	1.9
Menouf	2,760,431	116	58	100	263	0.9
Behera	3,994,297	290	133	92	611	1.3
Ismaili	714,828	38	19	100	95	0.7
Giza	4,784,099	138	60	87	274	0.8
Menia	3,310,129	28	9	64	37	0.6
Tripoli Plan	305,000	85	85	100	200	1.0

Figure 3.1-5 shows the population distribution versus to the bus fleet for the Egyptian Governorate excluding the large cities like Cairo and Alexandria As can be concluded from the figure, Suez City seems to be the most reasonable similar city for Tripoli. The similarity between the two cities is investigated and can be summarized as shown in Table 3.1-5.

Table 3.1-5 Similarities between Tripoli and Suez Cities

City	Suez	Tripoli
Location	Port City	Port City
Population	472,335	305,000
No. of Households	97,101	67,000
Average Size of Household	4.3	4.5
Growth Rate	2.08	2.00
Labor Force	245,000	200,000
No. of Buses	76	(Planned) 85
Congestion Rate	(Note: High Rate) 2.8	1.0

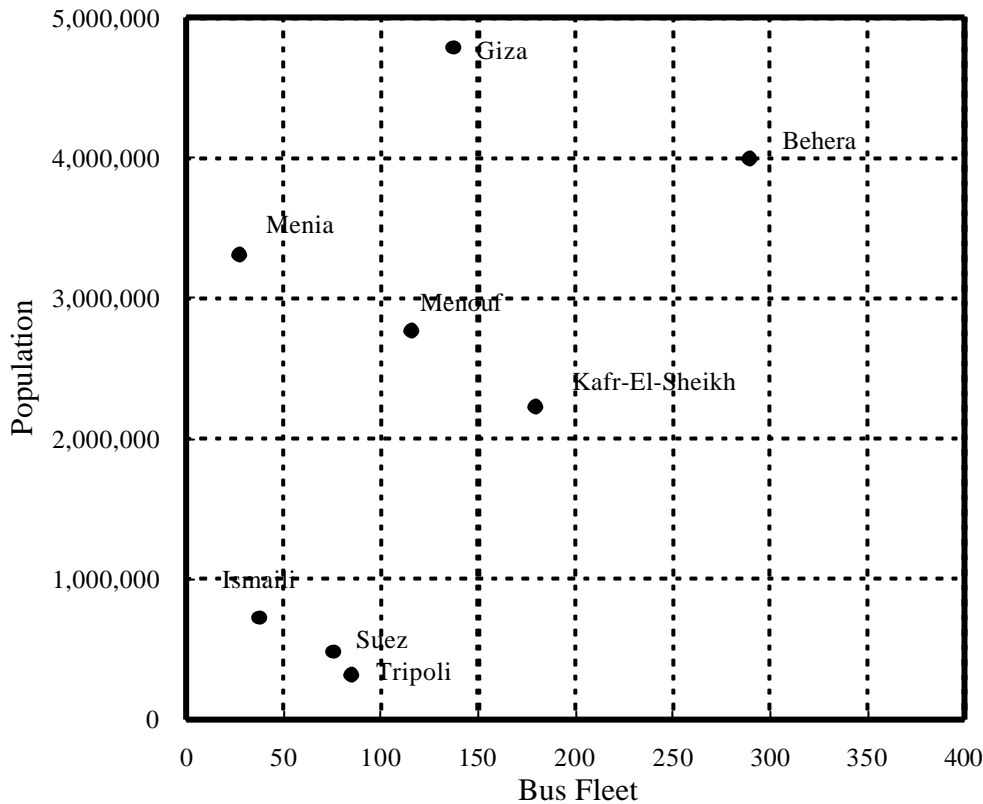


Figure 3.1-5 Population and Bus Fleet in Different Governorates

Based on this investigation, it is concluded that the estimated required number of mini-buses to start the service in Tripoli City is quite reasonable. Even the number is greater than the one in Suez City that have a little more population, but this is necessary to avoid the high congestion rate of about 2.8 in case of Suez City as this high congestion rate is against the comfort and convenient of passenger.

3.2 INTERCITY BUSES

As mentioned before, private companies manage all the regional buses operation. If this policy will keep going, the duties of the official authorities during the coming few years is to create the appropriate service facilities for these company buses. Currently, impressive congestion condition is observed at the city center where these buses terminals are located. Many of the intercity buses are large ones and the street widths in the downtown area are very inadequate. Since there is no standard planning for these terminals, double bus parking is too profound.

Therefore, the strategy proposed by this Master Plan depends on creating a reasonable solution to prevent the entrance of these intercity buses to the city center. This can lessen the sever traffic congestion in the city center and principally it will prevent the service taxi to park near too the intercity buses and block the streets in the front of the through traffic.

To avoid the entrance of intercity buses and taxi to the city center, realization is to consider two intercity terminals. The reasonable locations are presented in Figure 3.1-3. One location that may have the first priority is located in south side of Tripoli at Behsass. This location is already under consideration by the local officials. The second location is located in the city north side. This arrangement after terminated can prevent the intercity public buses from entering the crowded city center.

In the planning of these intercity bus terminals attention should be paid to consider locations for taxi

and city public buses. Including these other transport facilities will insure the comfort and convenience for the passenger re-connections to their destinations. Therefore, the geometrical planning of these terminals must include these facilities.

Hereafter, a preliminary estimation was described in Table 3.2-1. This estimation was based on the information obtained from the cordon line survey; public transport survey, socio-economic data and traffic demand forecast. These data show that currently, the Southern Terminal is expected to serve 776 large bus/day and 6539 mini-bus/day. The Northern Terminal will serve 402 large bus/day and 4429 mini-bus/day. The Southern Terminal must serve the demand of the Northern Terminal because this terminal construction will be considered later.

In the estimation, it was assumed that the large bus average service time inside the terminal is 15 minutes and for the mini-bus is 10 minutes. The bus operation is considered concentrated within 14 hours from 06:30 to 20:30. Both of these assumptions are logical based on the experience on the developing countries.

Table 3.2-1 Intercity Terminals

Year	2005	2010	2020
Southern Terminal			
Large Bus No. of Stall	24	15	17
Mini-Bus No. of Stall	140	90	95
Northern Terminal			
Large Bus No. of Stall	-	8	10
Mini-Bus No. of Stall	-	55	60

CHAPTER 4

TAXI PLAN

CHAPTER 4

TAXI PLAN

4.1 CITY TAXI

Recently, city taxi is the main mode of public transport within Greater Tripoli. Three types of taxi are accessible that taxi, shared taxi (service taxi) and inter-city taxi. Most of the intercity taxi are parked in the city center. Service taxi have some looks resembling terminals in the different Municipalities and major areas. In the time, being standard taxi stands cannot be observed. The current and future required number of taxi is presented in Table 4.1-1. In the estimation of the required numbers, the following assumption have been considered:

- Average occupancy rate of taxi is three passenger/veh.
- Trips are concentrated within 14 hours from 06:30 to 20:30.

Table 4.1-1 Forecast of City Taxi Demand

Year	2001	2005	2010	2020
Population	330,930	360,304	390,447	454,174
Active Population	200,000	233,000	265,000	339,000
Trips/Day	600,000	699,000	795,000	1,017,000
% of Public Transport	36	40	45	50
Public Transport Trips/Day	216,000	280,000	358,000	508,000
% of Taxi	90	70	60	50
Taxi Trips/Day	194,000	192,000	212,000	257,000
Estimated No. of Required Taxi	4600	4667	5120	6000

City taxi must have a special planned area in the city central terminal of the city bus and in the both North and South intercity terminals. This implementation is necessary to provide the reasonable transfer between the public bus services and the taxis ones. Taxi stands are required in the locations where high demands are concentrated. The plan to achieve this implementation is shown in Figure 3.1-3.

The anticipated required number of taxi stalls in the city and intercity terminals is shown in the Table 4.1-2 hereafter.

Table 4.1-2 Required Number of City Taxi Stalls in the City and Intercity Terminals

Year	2005	2010	2020
City Terminal	25	30	35
Southern Terminal	8	16	24
Northern Terminal	-	8	16

4.2 INTERCITY TAXI

The plan for intercity taxi is depended on the assigning of the intercity taxi terminals in the same locations with the intercity buses as shown in Figure 3.1-3. This implementation will control the construction cost and supply the users with a comfort services. This policy means that the proposed two main locations on the Northern and Southern sides proposed for intercity bus terminals will be also included the enough spaces for the intercity taxi stalls. This plan can eliminate the illegal parking in the city center. The passengers will have the chance to select the intercity bus or the shared taxi.

This kind of competition is recommended to submit the best services to the clients especially the both services are managed by the private sector. The success of this implementation will be depended on preventing taxi drivers from pick up passengers out side the terminals.

Currently the number of intercity taxi that will be served by the Southern Terminal is estimated to be about 13196 taxi/day. Another about 6845 intercity taxi is expected at the Northern Terminal. As mentioned before in the intercity buses, during the short-term plan, the Southern Terminal must handle the both demands for the Northern and Southern Terminals. Table 4.2-1 shows the expected required number of intercity taxi stalls. These values are estimated based on the assumption that one taxi average service time will be about 5 minutes inside the terminal.

Table 4.2-1 Required Number of Intercity Taxi Stalls

Year	2005	2010	2020
Southern Terminal	106	87	94
Northern Terminal	-	28	30

CHAPTER 5

SCHOOL TRANSPORT

CHAPTER 5

SCHOOL TRANSPORT

5.1 DEMAND FORECAST

In general, the Master Plan policy is to increase the share of school bus trips in future, as buses are environmental friendly transport mode. In Tripoli however, school buses cause recognizable traffic jams during the morning and evening peaks. Most of the buses are large and block the road during loading/unloading students. Most of schools are concentrated in high-density populated areas as can be noticed in Figure 5.1-1. Almost all the schools lack the reasonable off-street parking spaces. Parking of school buses on streets is blocking the streets in the face of through traffic. Furthermore, the survey analysis shows that shared taxi provide the same function of school buses with lower cost and shorter trip time.

With this background and through consultation with local authorities, it is concluded to keep the share of school bus within the current limit. In the estimation of the required number of buses a mini-bus of 25-seat capacity and one round trip/day are considered. The plan depends on mini-buses since they have higher operating speeds and more efficiently maneuvering performance rather than the large buses. Table 5.1-1 shows the results of the estimated required number of school buses during the short, medium and long term plans. Based on this scenario, the required number of school buses will increase from 420 buses in year 2001 to 1020 buses in 2020.

Table 5.1-1 Current and Future School Bus Requirements

Year	2001	2005	2010	2020
Population	330,930	360,304	390,447	454,174
Active Population	200,000	233,000	265,000	339,000
Student Population	81,122	88,689	96,257	111,391
Trips/Day	600,000	699,000	795,000	1,017,000
% of Public Transport	36	40	45	50
Public Transport Trips/Day	216,000	280,000	358,000	508,000
% of School Buses	10	10	10	10
School Bus Trips/Day	22,000	28,000	36,000	51,000
Estimated No. of Required Buses	420	560	720	1020

5.2 SCHOOL TRANSPORT PLAN

The implementation to solve the current problems due to school buses seems to be very complicated. Especial techniques in the short, medium and long terms are required. Understanding of Ministry of Education and other authorities are very important for the success of the solution plans. The considering of the following techniques can gradually decrease the problem severity in the short term and to solve it during the medium and long term:

- One approaches is to substitute the large buses with a mini ones. The mini-buses will have a higher operating speed and more easily maneuver performance.
- If possible, create a bus, taxi and private car, respectively parking stalls inside the schoolyard and much better in the front of the school if enough space is available. This method will not need big fund.
- Arrange with the Ministry of Education to make short time shifts in the school day start and

end for the different stages of schools. Such arrangement is adopted in other developing countries to mitigate the traffic congestion during the peak hours. However, it can be adopted if the bus serves only one kind of school graduates, e.g. only primary school students. If the bus will serve different types of school graduates at the same time, adaptation of this solution cannot be achieved.

- Arrange with the Ministry of Education to adopt a two days weekend with the extension of the school day during the other 5 days. It is also desirable to consider these two days weekend as Friday and Sunday for a half of the schools and as Saturday and Sunday for the other half. This policy will reduce the school trips to the half value on Saturday and Friday. This method also will not need any fund for its implementation. Under the long day policy, the start and end shifting of the school day mentioned on the above point can be made more recognizable.
- Strengthen the public bus transport service to the locations characterized with high school trip demand. That will create the chance for the public city buses to replace the school buses and will limited the future increase in the school bus fleet.
- Construct all of the new schools in the new developing areas. The new school must be planned with the required number of parking stalls.

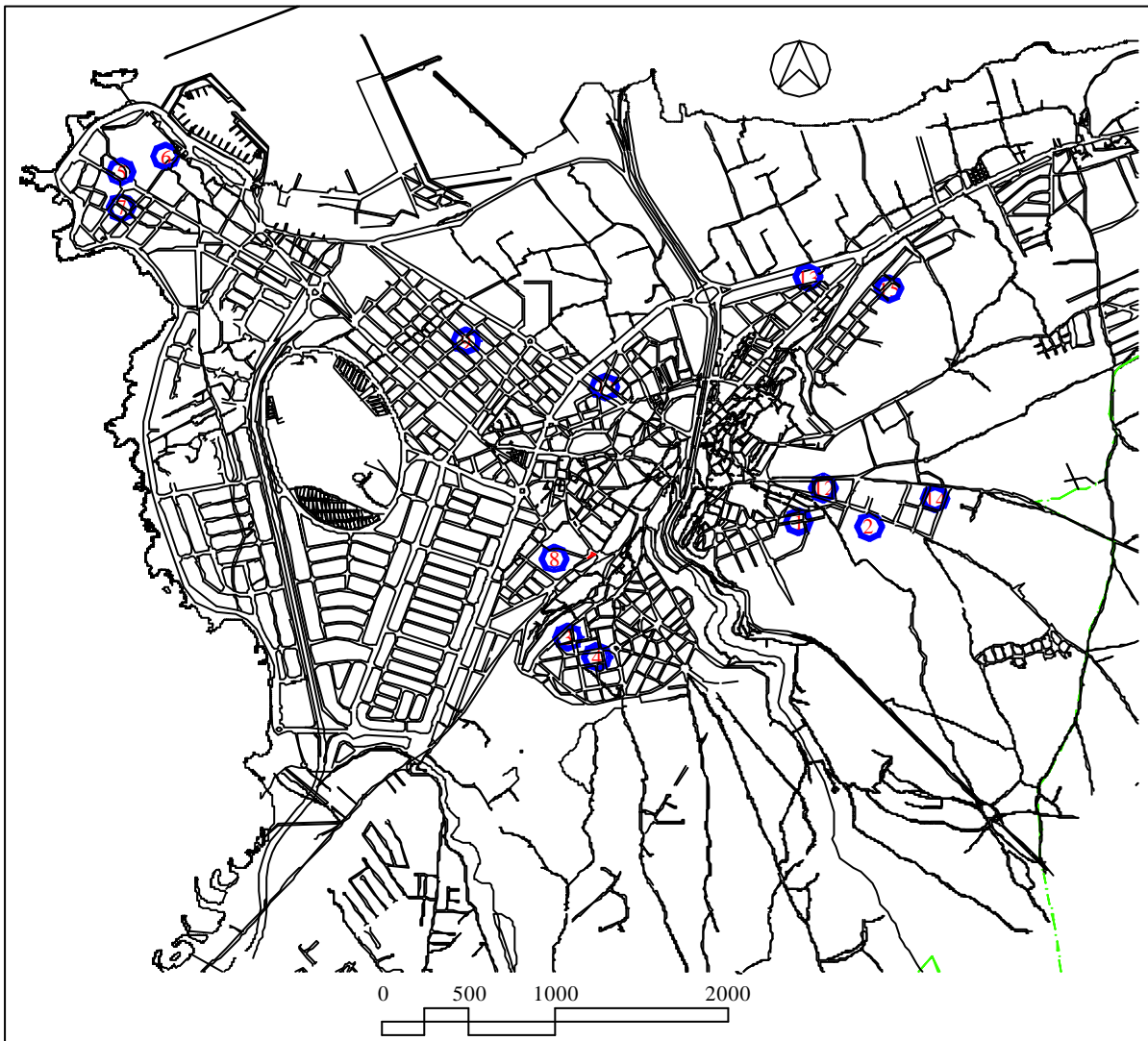


Figure 5.1-1 Location of Schools

CHAPTER 6

COST AND IMPLEMENTATION PLAN

CHAPTER 6

COST AND IMPLEMENTATION PLAN

Table 6.1-1 shows the cost and the implementation plan for the public transport aspects. As can be noticed from the table the target of the master plan is to finalize all the public transport projects by the end of the middle-term plan.

Table 6.1-1 Cost and Implementation Plan

Plan	Year			Cost (BillionLL)
	01-15	06-10	11-20	
Public Bus	10.80	4.60	8.15	23.55
Bus Routes Nos. 1 and 2,	2.00		4.00	6.00
Bus Routes Nos. 3 and 4		2.00	4.00	6.00
City Bus Central Terminal	0.20			0.20
Behsass Transport Center*	8.00			8.00
El-Bedaoui Intercity Bus Terminal		2.50		2.50
El-Qoubbe City Bus Terminal	0.15			0.15
El-Mina City Bus Terminal	0.15			0.15
El-Bedaoui City Bus Terminal	0.15			0.15
Abou Samra City Bus Terminal	0.15			0.15
Developed Area City Bus Terminal		0.10	0.15	0.25
Taxi	1.15	0.20	0.15	1.50
Central Terminal	0.15			0.15
El-Mina Taxi Stand	0.25			0.225
El-Bedaoui Taxi Stand		0.10		0.10
El-Qoubbe Taxi Stand	0.15			0.15
Abou Samra Taxi Stand	0.15			0.15
Behsass (Ras-Maska) Taxi Stand*	0.15			0.15
Behsass Intercity Taxi Terminal*	0.15			0.15
Bedaoui Intercity Taxi Terminal	0.15			0.15
Developed Area Taxi Terminal		0.10	0.15	0.25
School Bus	0.55	0.20	0.20	0.95
School Bus Parking Stalls	0.15			0.15
Shard Taxi & Private Car Stalls	0.10			0.10
Large Buses Replacement	0.20	0.10	0.10	0.40
New Schools Parking Facilities	0.10	0.10	0.10	0.30
Cost (Billion LL)	12.50	5.00	8.50	26.00

* Components of Behsass Transport Center