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ARAB REPUBLIC OF EGYPT



GREATER CAIRO: A PROPOSED URBAN TRANSPORT STRATEGY



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This Urban Transport Strategy Note (UTSN) for Greater Cairo (GC) was prepared under the direction of Hedi Larbi Sector Manager, Transport, Middle East and North Africa Regional Office, World Bank, and Ahmed Eiweida, Task Team Leader, Greater Cairo Development Project. The text was prepared by Richard Podolske and edited by Hedi Larbi and Robin Carruthers, taking account of comments from Sam Zimmerman and Slobodan Mitric, Urban Transport Advisor, World Bank, and other World Bank staff. The findings of this report are based on discussions with government officials and transportation experts, a review of available documents (especially the JICA funded Cairo Regional Area Transportation Study and the Cairo Urban Toll Expressway Network Development Study), visual field observations, and relevant experience in other major metropolitan cities in the world. Representatives of the Transport Ministry, the Ministry of Housing, Utilities & Urban Development; the General Organization of Physical Planning; and the three Governorates of Cairo, Giza, and Qalyobiya were particularly helpful in discussing transportation conditions in the GCR.

INTRODUCTION

Strategic planning is necessary but not sufficient if not followed by implementation and impact evaluation. Most large urban areas have an Urban Transport Strategy or an Urban Transport Master Plan (UTMP) that provides the framework within which transport policies are formulated and investments are planned. These Plans are rarely prepared more frequently than once every ten years, although they might be subject to review or revision within that period. Policy initiatives and urban development rarely turn out as projected in the Plans, but investments often follow quite closely to those proposed in the Plans. Cairo follows this generality, with Urban Master Plans having been prepared in 1970 and 1982, and an Urban Transportation Master Plan (UTMP) in 2002. Although the UTMP was prepared with the participation of and endorsed by later most of the agencies of government which were directly responsible for urban transport, it has not been formally adopted as the urban transport strategy of the Government of Egypt or of the three Governorates that are responsible for urban transport in the metropolitan area of Cairo.

The Urban Master Plans envisioned Greater Cairo (GC) as a polynuclear metropolis, with transport costs minimized by the development of new commercial centers closer to residential suburbs and with a major services center to the east of the metropolis, and new residential “settlements,” construction of metro and regional rail lines, expansion of the tramway network to Giza, and construction of a new ring road.

In the period up to 2000, the population of GC increased by “only” 5 million rather than the 7 million projected in the Urban Master Plan of 1982, as there was a simultaneous reduction in birth rates and migration away from the metropolis. However, the Central Business District (CBD) of Cairo grew much faster than expected and overflowed to the west bank of the Nile, and the concept of a new services center to the east of Cairo was abandoned. There a continued and largely uncontrolled expansion of lower class housing along the edges of the city, instead of the creation of new residential settlements. New towns were belatedly created, but had populations of about 250,000 instead of the almost 3 million projected. Given the absence of rapid and affordable public transport, these towns attracted relatively wealthy residents who had cars. The first metro line was built as proposed, and eventually the new ring road was also built. But few of the other components of the Plan were implemented.

The Cairo Transportation Master Plan of 2002 provided a new framework for consideration of an integrated urban transport strategy that emphasized putting “people’s mobility before that of vehicles.” The Master Plan took account of three “missions” for the urban transport strategy:

- an economically effective urban transport systems;

- equitable people's mobility, and;
- a safe and environment-friendly transport system.

These “missions” would be achieved through:

- implementing major new public transport infrastructure projects
- facilitating policy and modal integration
- facilitating user-oriented public transport
- introducing traffic demand management, including fuel tax increases and parking charges in the CBDs and Cairo and Giza

As with the earlier Urban Plans, few of the policy components of the Cairo Transportation Master Plan have been implemented, but some of the investments, such as the upgrading of the Regional Ring Road to an Integrated Transport Corridor and the third underground metro line, have been initiated.

Objectives of the Proposed Urban Strategy Note. The objective of the proposed urban transport strategy note is to provide an assessment of the urban transport system in GC, identify what now appear to be the most pressing urban transport problems, and propose a framework for urgent policy actions and investment priorities that would be the basis of a formal transport strategy to be adopted and implemented by the authorities of the metropolitan area of Cairo. This note is essentially based on a thorough review of the 2002 Urban Transportation Master Plan for GC and a rapid analysis of the current conditions and performance of the urban transport system. Given the acuity of the urban transport issues, the long sustained deterioration of the transport conditions in Cairo and the subsequent huge economic cost for the country, this note would have achieved a major objective if it succeeds in triggering a serious debate among all stakeholders around the issues identified and how better to address them and prevent further aggravation of the situation in order to ensure that greater Cairo will remain competitive and pleasant to live in.

Therefore, the presentation of this note is in the form of a Proposed Urban Transport Strategy, for the consideration of and further refinement by the central and local governments and institutions involved in the urban transport sector in Greater Cairo. It should be used as a “living think piece” to be updated on a regular basis (for example every 3 years) to take stoke of the situation of the urban transport sector, assess the impact of actions taken, identify emerging problems, and guide future policy actions and selection of priority investments in the sector by the Government and the three Governorates of the GC.

Brief Summary of the Paper Conclusions. The main conclusions of this review are that the urban transport conditions continue to deteriorate in spite of the Government's efforts and that the UTMP for GC was about right in its assessment of the issues and most appropriate solutions, but that with the benefit of more recent experience gained since 2002 there is an urgent need to put an even greater emphasis on people's mobility through according even higher priority to public transport systems, as well as on traffic and demand management and that their successful implementation requires even more

efforts on institutional restructuring and human resource development. The resources required for the infrastructure developments proposed in the UTMP are of a magnitude that exceeds the current funding capacity of the UT sector and hence the need for meeting the hard fiscal constraint in Egypt through further and more rigorous investment prioritization on the basis of objective economic criteria and cost effectiveness. Financing of the sector, not covered by the UTMP, has been reviewed and the conclusion is that there is an urgent need for the Government to develop and implement a more sustainable financing framework for the UT sector. This will include application of adequate user charges policies to reflect, to the extent possible, actual transport costs for all transport modes, and substantial reduction of the current subsidies through low transport fares and pricing of gasoline and diesel. The social objective of making public transport affordable is laudable objective but it can be better achieved at lower cost by using more effective public transport modes (high capacity and mass transport systems), efficient transport operators (concessions/lease to private operators) and more appropriate subsidy schemes to those who really need them.

Outline of the Report. This note includes 9 chapters. The *first chapter* provides a quick overview of the Current Situation of the UT in GC. In *chapter 2*, we present the main guiding principles and key Components of the Proposed Strategy to prepare the ground for the following chapters. *Chapter 3 to 9* elaborate on the issues and policy recommendations for each of the following components of the proposed strategy: Organization and Operation of Public Transport Systems (*Chapter 3*), Investment Policy in Urban Transport (*Chapter 4*), Traffic Management Policy (*Chapter 5*), Introducing Travel Demand Management (*Chapter 6*), Strengthening Traffic Enforcement (*Chapter 7*), Building Urban Transport Institutions (*Chapter 8*), Affordability of Urban Transport services and Financing policy (*Chapter 9*). Finally a *last Chapter (10)* presents a priority action program including selected coherent mix of policy actions and cost effective investments to be implemented in the short and medium terms to initiate a process of long term improvements of the UT conditions and operations in Cairo metropolitan.

EXECUTIVE SUMMARY

A. Overview

1. The objective of the proposed urban transport strategy note is to provide an assessment of the urban transport system in Greater Cairo (GC), identify what now appears to be the most pressing urban transport problems, and propose a framework for urgent policy actions and investment priorities that would be the basis of a formal transport strategy to be adopted and implemented by the authorities of the metropolitan area of Cairo. Given the acuity of the current urban transport issues, the long persistent deterioration and inefficiencies of the transport conditions in Cairo and the induced huge economic cost for the country, this note would have made a major achievement if it succeeds in raising awareness of and initiating a local debate among all stakeholders (public and private sectors, users, etc.) around the issues identified and how better to address them to prevent further aggravation of the situation and ensure that greater Cairo will remain competitive, attractive and pleasant to live in.

B. Critical Urban Transport Issues

2. While highly diversified, in terms of supply and related infrastructure and facilities, Greater Cairo Urban Transport System suffers major inefficiencies which translate into: poor transport services especially for the low income groups captive of public transport modes, high economic, environmental and fiscal costs for the country, and most probably high cost of doing business in the metropolitan area of Cairo. More specifically, the most critical urban transport issues include:

- ***Aggravated traffic congestion:*** Cairo is experiencing traffic congestion that places it among the worst in the world. This has serious economic consequences and contributes to deteriorating air pollution conditions.
- ***Poor public passenger transport system:*** Cairo relies on under developed, overcrowded and unreliable passenger transport services. The main positive characteristic of these services is their low fares. However, for those services that are still operated by the public sector, this result in unsustainable subsidies, and for private services that try to compete with the heavily subsidized public services, the resulting fares are commercially unsustainable. The most obvious outcome is inadequate public transport supply and deteriorating service quality. Public buses are poorly maintained and many are out of service, while private operators are restricted to small and aging vehicles without the means to replace them. The large number of operators and lack of an institutional framework to properly manage and

regulate the system have led to a lack of integration among passenger transport modes, rapid development of very low quality and unsafe supply, making already unpleasant traveling conditions worse than they need be.

- ***A high accident rate:*** The road transport death rate in Cairo is very high. At least 1,000 Cairenes die each year in motor vehicle accidents, more than half of them pedestrians, and over 4,000 are injured. Except Teheran, these rates are by far higher than what has been recorded in other mega cities of the world.
- ***Air and noise pollution:*** Mobile source air pollution in Cairo is serious both with regard to particulate matter as well as noxious chemicals. Noise levels are high and aggravated by very old large proportion of the car and taxi fleet. Vehicle inspections that should limit exhaust gas pollution are mostly ineffective.
- ***Institutional weaknesses and fragmentation:*** Like many other cities experiencing rapid population growth and even faster motor vehicle growth, Cairo suffers from highly fragmented, largely uncoordinated and inadequately staffed institutions to deal with urban transport problems of this magnitude.
- ***Inadequate financial arrangements:*** Overlaying all of the above problems are inadequate financial arrangements leading to under investment in transport facilities, especially in public transport capacity which suffers major shortages; inadequate cost recovery and consequent excessive subsidies for urban transport public; highly subsidized pricing of gasoline and diesel fuels which favor less efficient private transportation (private cars and small taxis); and little participation of formal private sector in financing and/or managing urban transportation infrastructure and services.

C. Proposed Strategy

3. **A new political opportunity for the development and implementation of a comprehensive urban transport strategy in GC.** The new reform-minded government, in office since December 2004, has adopted, as a general government policy, holistic approaches to address public service delivery issues and implement policies that reduce costs and improve the quality and coverage of public services in a sustainable manner. In this context, the government has initiated the implementation of an ambitious program to improve urban transport services in GC. Construction of the third line of the metro system is underway and a study has been commissioned to expand the expressway system under public-private partnership (PPP) arrangements. In addition, the Government is committed to improving the methods of administration and funding of urban transportation programs and investments. However, studies commissioned so far have dealt more with major investments rather than with operational, institutional and

financing problems. To fill this important gap, the new government is intending to deal with the long overdue urban transport issues in GC from a very pragmatic and comprehensive perspective that includes substantial institutional reforms, all in the context of a holistic strategy.

4. **Three premises are underlying the UT strategy in GC.** Building on the global experience in large metropolitan areas, the requirements of a fast growing demand of urban transport travels in Greater Cairo and the results of the present review, the proposed Strategy is driven by three guiding principles:

- (a) Giving a high priority to developing urban transportation institutions and improving urban transport finance are prerequisites for sustainable improvements of urban transport services.
- (b) The basis of providing capacity for large urban travel demand should remain with public transport system. This will ensure optimal use of scarce urban space in Cairo, provide all segments of people with adequate transport choices and reduce the pressure of investing more in road infrastructure for private cars. A focus of public expenditures, on expanding public transport supply and improving its operations will have a greater impact on making urban transport services more person-oriented and cost effective than a focus on trying to accommodate expanding demand for private car use.
- (c) Expanding and making more efficient use of public transport assets and existing road space is the most effective use of public resources. These actions are also prerequisites for ensuring that new investments in public transport achieve their full potential benefits.

5. **The proposed urban transport strategy for the GC concentrates on seven strategic areas of intervention.** The above principles intend to guide the policy makers in developing a comprehensive urban transport strategy that addresses the diagnosed issues in the specific institutional and fiscal context of Egypt. Following these principles, the proposed strategy consists of a mix of policy actions and priority investments in eight key areas:

- i. ***Developing and sustaining urban transportation institutions.*** Addressing major urban transportation issues is a complex undertaking but it can no longer be deferred. The current institutional set up is not designed for dealing with complex transport problems of a mega-city like GC. Current institutions are not staffed with adequately trained or sufficient qualified staff to devise strategies, formulate policies and implement solutions to these issues. A long term and sustained program of institutional change combined with staff development has succeeded in other mega cities faced with this situation and is the first strategic action. The first strategic recommendation proposed for immediate decision by the authorities is to set up dedicated institutions to properly plan and manage the UT sector in

- GC. Due to the complexity and scale of the UT issues in GC and the current weak and fragmented institutions involved in the sector, there is a need for establishing a politically empowered and technically competent UT authority to properly manage and regulate this important sector, mobilize required financial resources and provide quality advisory support to the decisions makers in GC.
- ii. ***Setting Decision Making Process for Selecting Priority Investments in line with realistic funding capacity in the urban transport Sector.*** Despite large investments in metro lines and urban road capacity over the last two decades, the level of investment in transport infrastructure and services has failed to keep pace with the increasing demands. As the Cairo metropolitan region continues to expand, the demand will continue to increase faster than the availability of funding. While it is possible to develop lists of projects that if implemented would address the lack of transport capacity and other deficiencies in the present supply of transport services, it is more difficult to determine how they would best be funded. Since funding is unlikely to be available to allow all the proposed projects to be implemented, a sound analytical method of assessing priorities needs to provide reliable evidence and advice to support the making of political decisions on which investments to approve and implement. The *second* but perhaps most fundamental action in the proposed strategy will be to implement a more effective decision process for making strategic choices and setting investment priorities on the basis of objective criteria such as: cost-effectiveness, economic and social returns, environmental impact and potential to attract the private sector participation.
- iii ***Sustainable financing of urban public transport system: greater reliance on user-charges.*** Affordability of public transport has been so far a successful component of urban transport policy in GC achieved through regulated low fares and highly subsidized gasoline and diesel. The social objective of affordability will remain a key component of the proposed Strategy. However, attempting to ensure affordability by implementing low fares for everyone is not a cost efficient way of achieving this objective. It diverts resources that could be used for investment to subsidies for many passengers who do not need them. The principal of affordability will be maintained as *the third* area of action, but implemented through policies that focus more on reducing subsidies while targeting direct or indirect support to those who need them most rather than on overall low fares. Several subsidy schemes and cost reduction measures could be developed (see below). A promising logical source for much of the funding for investment is much greater reliance on user charges. Many proposals for changing transport user charges will be covered under the topics of traffic and demand management. But there is another group of user charges that are designed to raise revenue rather than change demand for services. Most prominent among these are toll charges and higher prices for transport fuel. These two measures should be seriously considered by the authorities if sustainable financing of UT operations is to be achieved.

- iv. ***More efficient organization and operation of public transport services:*** A recent advance in private sector provision of public transport service has come about not as a result of policy change, but rather because of a lack of such change. The public sector no longer has the resources to make the required investments in public transport infrastructure, or operational capacity to provide public transport services efficiently or to a quality that will discourage even greater use of private cars. The fourth area in which action is proposed is therefore a radical restructuring of the public transport system in view of improving its organization (network structure and capacity, gradual formalization of the informal supply, etc.), operations and delivery of public transport services (increasing productivity: more organized private participation, high transport capacity, dedicated public transport facilities, etc.).
- v. ***Modernized Effective Traffic management system.*** The current practice in Traffic management techniques to make best use of the limited supply of road capacity are outdated, inappropriate and insufficient to deal with the volume of traffic and make most efficient use of existing road space. These practices and related management culture should be modernized, and brought up to international standards in practice in mega cities of the scale of GC. Therefore, the fifth area of action will be to implement new traffic management measures that make best use of available technology and know-how to address traffic congestion. These will include more extensive and better coordinated traffic signal systems, better designed street intersections and pedestrian facilities, coherent on and off-street parking management policies and priority treatment for on-street bus operations. ***Application of proactive travel demand management techniques.*** Demand management techniques are not yet introduced in GC in spite of their potential benefits in alleviating congestion. They are aimed at making demand for transport, and particularly the use of private cars, more compatible with the road space available in congested areas and at peak times. The measures available include banning parking in sensitive areas, higher time-based parking charges, tolling selected roads, cordon pricing to permit entry into designated high density areas and use of time based public transport fares to encourage off-peak travel. Therefore the sixth area of action should concentrate on the introduction and full application of these techniques, particularly in those parts of the metropolitan area that experience the most severe traffic congestion.
- vii. ***Enhanced institutional set up for stricter enforcement of traffic rules.*** The traffic and demand management measures proposed for implementation will have negligible impact unless they are more rigorously enforced than the current traffic management measures. Such rigorous enforcement will require a different institutional structure and a change in users' perceptions of the importance of the measures. The seventh area of action will be to create a new system for the enforcement of traffic and demand management measures, and include selected projects to demonstrate the potential impact of improved enforcement. The new

system will require less involvement of the police in traffic management (which should be assigned to traffic management units (TMU) in the governorates), giving them more time to deal with their more core functions of enforcement.

D. Short and Medium Term Priority Action Program

6. **Selection Criteria for the Priority Action Program.** In support of the proposed strategy a priority program of policy actions and investments has been developed to assist the decision makers in allocating responsibilities and setting priorities for involved agencies to ensure that the proposed UT strategy will effectively be implemented. The priority investments identified in the UTMP in 2002, all seem to have a high social justification. However, overall cost of these investments (about US\$ 20 billion in the next 15 years) is clearly beyond the financial capacity of the public sector (in comparison to past resources invested in the sector). Therefore a more detailed selection criteria system is needed to ensure that resources are allocated to the most cost effective investments rather than to those that are easiest to implement.

7. **Scoring system and derived priority actions.** The proposed Strategy uses an approach similar to the points scoring system used in the investment assessments in the 2002 UTMP, but giving more account to relevance of projects to the overall Strategic objectives and the likely amount of funds which could be mobilized. The criteria taken into account are:

- Extent to which proposed investments support the urban transport strategy;
- Extent to which investments deal with the main weaknesses in the present system;
- Cost-effectiveness in meeting the objectives of the proposal;
- Pilot or demonstration potential of the selected investments,
- Financial and institutional sustainability of the investment;
- Readiness for implementation, to quickly show visible traffic improvements, and;
- Priorities indicated recently by the Government (Prime Minister) and by the Governors of the three Governorates.

8. **Proposed priority actions and investments in the short and medium terms.** Based on the above selection approach the following specific projects have high overall rankings for implementation in the short term and medium terms (up to ten years). Other projects, mostly those requiring high levels of public investment, have high ranking in the longer term and hence will need to be deferred. The priority actions and investments resulting from the above approach and which implementation, if decided, would tremendously improve urban transport conditions and performance, are the following:

- ***Building new Institutions and Developing qualified Human Resources.*** All of the proposed institutional improvements, with the possible exception of the proposed Metropolitan Expressway Authority, have a high overall ranking for priority action. The following is a summary of the proposed institutional developments to be undertaken:

- (a) Establishing a High Level Metropolitan Cairo Transport Steering Committee (MCTSC). This could emanate from the existing Steering Committee set up to oversee the UMTF with a redefinition of its role as the main policy decision maker in the sector including the following main responsibilities:
- Assisting in the establishment and overseeing the development of the sector institutions (as listed below)
 - Reviewing and vetting the strategic proposals developed for improving the transportation systems of metropolitan Cairo
 - Making policy decisions, setting investment priorities and overseeing their implementation.
- (b) Creating a Metropolitan Cairo Transportation Authority (MCTA). The MCTA is conceived as the technical and executing arm of MCTSC. Therefore, it should be set up as a matter of priority to be in charge of implementing the Government urban transport strategy and improving urban transport conditions in a cost efficient way. MCTSC should be the board of the proposed MCTA. The priority actions MCTA should undertake include:
- Developing and implementing the proposed institutional reforms including a financing strategy for the sector and a reform plan for the CTA.
 - Preparing rolling 5 year transport capital investment programs for Cairo metropolitan area and financing arrangements for government decisions.
 - Preparing the restructuring strategy of the public and private sector bus route network and the regulatory framework for public-private-participation (PPP)
 - Contracting out existing and new bus and rail-based transport routes on a competitive basis
 - Updating the multi-modal transport plan, carrying out required policy studies, and building the sector information system to inform the policy making process.
- (c) Undertaking Reforms in the Cairo Transport Authority (CTA). This action should be entrusted to MCTA and will consist of developing and implementing over a reasonable period a reform plan which should include gradual concessioning of bus and tram services currently operated by CTA. Regulatory activities will be assumed by the MCTA.
- (d) Strengthening & Creating Traffic Management Departments (TMD) in each of the GC Governorates. TMD staffed with

competent professionals is prerequisite for sustainable improvements of traffic congestion in GC. These structures will be in charge of the daily management of urban roads capacity and traffic demand, including:

- Preparation and implementation of traffic management schemes for high density districts, corridors, and specific traffic bottleneck locations
- Development of capital budgets for implementing traffic management schemes
- Procurement, operations and maintenance of traffic control devices, especially the traffic signal system
- Preparation of parking policies and plans for implementation by parking departments

(e) Creating Parking Departments (PD) in each GCR Governorate. There is an important untapped potential of better use of road capacity and revenue generation in GC. To realize such a potential, dedicated PD within each governorate should be created to develop, and implement a coherent parking strategy and policies. Their main responsibilities will include:

- Preparing a parking management plan (supply, pricing policy, regulations, investment plan, and PPP processes) in cooperation with the governorate traffic management departments
- Contracting out the development and management of off-street garages to the private sector under public-private-participation (PPP) arrangements.
- Contracting out and enforcing, in coordination with the police, on-street paid parking facilities.

(f) Assisting the Traffic Police in Mobile Traffic Enforcement. This institutional change is dictated by the aggravated traffic congestion and the need to improve the current practices if congestion is to be alleviated. The proposed change consists of redirecting the role of the traffic police toward placing greater emphasis on mobile traffic enforcement and traffic incidence management, and gradually divesting traffic engineering responsibilities to the proposed TMDs so as to concentrate on traffic enforcement. This will include redefinition of roles and mission, and a staffing redeployment strategy and will require the support of the senior management of the traffic police.

(g) Creating an Expressway (Toll Road) Authority. A toll road authority will be required if the decision is made to proceed with the construction and/or conversion of existing road facilities/corridors into toll roads. This authority would be

responsible for regulating toll roads activities in GC, carrying out required studies and preparing transactions for PPP schemes, contracting out toll road facility designs, concessioning toll road construction and operations on a competitive basis, and managing toll road concession contracts.

The creation and/or reorientation of existing institutions will have to be carefully planned and executed to assure success. In general this may require new laws, operational by-laws, clear terms of reference detailing roles and responsibilities, new or revised staffing, training of staff, technical assistance during start up, and arrangements for adequate and sustained financing of operations. Detailed planning for these organizations would need to commence as soon as a decision is made to proceed.

- ***Upgrading and Extension of the Heliopolis Tram.*** Review of the different upgrading proposals of the tram system led to the following conclusion. The UTMP proposed a substantial and costly upgrade of the Heliopolis tram into a light rail system, including grade separations and other major infrastructure improvements. We suggest that a more realistic and cost effective upgrading be considered for the short term. Public investment in infrastructure (tracks, sub stations and signaling) will be needed. This will most likely attract private investment in rolling stocks and operations under an appropriate concession arrangement. However, given the high level of inter-action between track, signals and tram vehicles, the infrastructure investment and technology should be made simultaneously with the selection of the concessionaire. The level of required public investment and fares should be one of the decision criteria in the selection of the concessionaire. The possible merging of the Heliopolis tram with the metro system might also be considered if these systems are to remain in operation under a public sector entity.
- ***Restructuring of bus transport services.*** The main objective of this proposed action is to promote the development of a competitive, well organized, mostly formal high capacity bus-based transport supply. This restructuring will concern particularly private mini-buses and the large public bus companies. The proposed restructuring will consist of gradual “formalization” of the informal sector (through adequate regulatory and incentive framework) and rapid commercialization of the public sector bus operations (concession and contracting out of reorganized parts of the bus network). Although a high priority action, a detailed study is needed to properly design the structure of the bus network of public and private sector operators, definition of service standards, design of an appropriate and sustainable regulatory framework (including concession and PPP arrangements) to properly regulate the sector and promote competition. Once a well structured network of bus routes has been designed and competitively contracted out to public and private operators, it is suggested that an upgrading program of bus dedicated facilities (bus stops, dedicated lanes, priority at selected intersections, bus information system) be implemented to increase the

productivity of the overall system, improve the quality of bus services and encourage modal shift toward increased use of the public transport system at the expense of private cars.

- ***Bus priority facilities*** to improve the public transport services on corridors with high but insufficient demand to justify a large capacity of mass transport system such as metros or trams. These facilities measures rank very highly in the priority actions and investments. They provide needed capacity in corridors other than those with the highest demand and are more cost-effective than metros in these corridors. The provision of priority bus dedicated facilities, possibly a BRT, is proposed as a more cost-effective solution to providing capacity in the corridor of the planned 4th metro line. Another highly ranked investment is the proposal for a BRT system to serve 6th October, possibly to be upgraded later to a fixed rail system with more capacity. These new projects of high capacity mass transit systems can be structured to attract private sector through appropriate concession/leasing arrangements.
- ***Improved Traffic management Systems***, especially traffic signal upgrading and extension and junction improvements in the downtown congested traffic areas. Particular attention would be placed on facilities for pedestrians. More consultation with the governors of the Cairo and Giza metropolitan areas and/or their staffs is needed to detail the specific locations for possible traffic management interventions. The Giza Governor cited in particular the Giza, Sphinx, Remaiya squares as areas which are highly congested requiring special traffic engineering attention. Traffic engineering works along 4th metro line corridor (in Cairo and Giza Governorates) as prepared under the GC UTMP study are high priorities in this context. Along with the investments actions there is an urgent need to establish in each governorate a traffic management unit adequately staffed with, in particular, qualified engineers in traffic management and light signal programmers. The staff should receive appropriate training courses including on the job training through intensive participation in the planning and execution of the proposed traffic management measure.
- ***On-street and off-street parking programs***, especially those including an enhanced role of the private investment and operation under public-private-participation (PPP) arrangements. The priority programs would include on-street paid parking program, and well located off-street parking garages. Well located parking garages could be provided by the private sector at little or no cost to government if an adequate parking management framework is in place including a competent regulatory body (parking departments) and a transparent competitive bidding process for provision and operation of these facilities. Central Giza and the Cairo CBD (Figure 9) rate particularly highly in this category, as they do for traffic management measures;
- ***Traffic enforcement to maximize traffic management measures and to enhance traffic safety***. There is a widespread support for improved enforcement of traffic

- rules, but little motivation for the necessary institutional action to bring it about. An early decision is needed on the institutional arrangements under which the enhanced enforcement will be achieved. Whatever structure is adopted, the role of the traffic police should change from traffic management through static “at-point” enforcement to mobile enforcement with a view to ensuring that traffic regulations are complied with. Traffic management responsibility and related planning and engineering activities should revert to existing or to-be-created traffic management units in each of the three governorates. To accomplish these objectives, the police should receive vehicles and equipment as well as appropriate training in support of improved stricter enforcement activities.
- ***Toll Expressways*** score moderately high in the overall ranking. The high ranking derives from their institutional support as well as their potential to attract high volumes of traffic from existing congested roads. While they have public appeal and could attract private sector investment, urban toll road experience in the rest of the world has been mixed. Not only do the land and construction costs tend to be higher than estimated, traffic levels often turn out to be lower, not least because the negative impact of high tolls is underestimated. For toll expressways to achieve their roles of attracting traffic from existing roads while generating a profit for their private investors, detailed planning and preparation is needed. In the Cairo context it also will be important to assess the potential of these facilities to accommodate high volume bus services.
 - ***Urban Transport Financing and Subsidies***: as mentioned above, subsidies of public urban transport services will remain as an important feature of the government policy in the sector. However, reduction of subsidies should not be overlooked in the short to medium term. Carefully reducing passenger transport subsidies through gradual increase of fare levels while providing targeted relief to those who cannot afford to pay is one strategy that could be deployed. Regular increases in fuel prices which subsidize private vehicle owners also deserve high priority attention. Public transport dedicated facilities (free lanes, corridors, light transit systems) can play an important role in increasing productivity and reducing transport cost of the bus and tram system. Finally, well structured private sector participation (with public contribution in investments and/or in operations) in public transport services can bring about tremendous efficiency gains and reduce the fiscal burden of the government.

E. Assistance by the World Bank and Other Donors

9. The World Bank, together with other international financial organization and bi-lateral lending agencies, has considerable experience in reforming urban transport systems and funding integrated urban transport projects and, if requested, would be pleased to help in implementing the above described urban transport strategy with particular focus on:

- (a) Assisting in creating and strengthening competent institutional structures to properly plan and manage urban transport services and infrastructure
 - (b) Financing priority investments the GOE wishes to implement in order to rapidly relief congestion in most congested areas and improve public urban transport conditions in the GCR.
10. The approach of the World Bank could be as follows:
- (a) Organize working sessions with the main institutions and stakeholders, with a view to defining the implementation details and participating in an urban transport seminar to share the conclusions of those sessions with a wider audience.
 - (b) Once detailed implementation arrangements have been agreed, help national and local governmental agencies in the preparation of an urban transport project that would be the basis of funding requests to the World Bank and other IFIs. Because of its positive impact on carbon emission, such a project could be proposed to the Carbon Finance facility to benefit from additional grant money.
 - (c) Help in obtaining grant financing for a comprehensive institutional development study covering at least (a) the creation and launching of a Metropolitan Cairo Transport Authority, (b) strengthening / creating civilian traffic management departments in the governorates, and (c) improved financing arrangements for the urban transport sector. The study would define the functions, staffing and governance of the proposed institutions, as well as the performance targets they should achieve. It would be preferable for the study to be completed and its recommendations accepted before implementation of the project, to provide a greater certainty that the capacity to implement the Strategy and Project was in place

CHAPTER I

CURRENT SITUATION

- 1.1 The Greater Cairo Region (GCR), which includes the governorates of Cairo, Giza, and Qalubiya)¹ is among the largest, fastest growing, and densest major urban agglomerations in the world. Its population is about 16 million and projected to grow by about 1.7% per year for at least the next decade.² Population density exceeds 800 persons / hectare over much of the urbanized area. The GCR is the dominant metropolis of Egypt with approximately 20% of the national population and is the center of economic, educational, medical, cultural, and governmental activity.
- 1.2 The CGR is also the preeminent transport center of Egypt accommodating over 20 million motorized person trips and 7 million non-motorized trips daily. About 2/3 of all motorized trips are made by public transport,³ but about half of all motorized vehicles in Egypt operate in the GCR⁴ and the while the current car ownership rate is quite low, it will only take a small increase to bring about a dramatic worsening of the traffic congestion that is amongst the worst in the world. The average speed of traffic in Cairo is similar to that of other cities recognized for their severe traffic congestion (Bangkok, Mexico City, and Sao Paulo). Travel speeds in the Cairo central business district and in central Giza are typically less than 10 kph on typical business days.⁵

Table 1: Indicators of Mobility

City	Cars per 1000 population	Average Speed (km/hour)	Vehicles/ Km of road
<i>Cairo</i>	52	15.8 *	351
Bangkok	249	12.3	426
Mexico City	200	12.4	353
Tehran	95	24.0	249
Riyadh	221	52.0	106
Moscow	149	23.1	283
Sao Paulo	301	15.2	307

**Peak travel period speeds in central Cairo and Giza are less than 10 kph)*

¹ The populations of the Cairo, Giza, and Qalubiya governorates are estimated to be 7.2, 5.4, and 3.8 million persons respectively in 2006. See Transportation Master Plan and Feasibility Study of Greater Cairo Region in the Arab Republic of Egypt; Phase 1 Final Report, Volume III: Transport Master Plan, November 2002, page 2-68.

² Ibid, Volume III: page 2-68.

³ Ibid, page 11.

⁴ Ibid, page 2-48.

⁵ Ibid, page 8-8.

- 1.3 Ominous features of these statistics are the relatively low average traffic speeds and the high number of vehicles per km of road, both occurring at a low per capita car ownership. It therefore be expected that traffic conditions are bound to deteriorate rapidly as car ownership increases. The Transportation Master Plan for the Greater Cairo Region (2002) has predicted that the total number of cars in the GCR will increase by more than 4% per year, reaching more than 2.5 million by 2022. The total number of motorized trips is expected to increase at a little less than 3% per year during the same period.⁶ Without investments beyond those committed in 2002, the study projected that the average trip speed among all modes of travel would decrease from 19.0 kph to 11.6 kph and the average journey to and from work would take more than one and a half hours.⁷ The total economic cost of this “do nothing” scenario was estimated at 7.5 billion LE (1.6 billion US\$ in 2002 exchange rates) per annum.⁸
- 1.4 The situation has now been reached in which there is no simple solution to the wide range of urban transport problems. While addressing any one of them will bring about significant and observable improvements, the full benefits of any particular measure will not be realized unless other parallel measures are also implemented. This situation was recognized in the TMP that recommended a holistic strategy comprising many inter-related and mutually supporting measures be implemented.
- 1.5 Among the many issues to be addressed and that are dealt with in this Strategy, the most urgent include:
- (a) **Serious traffic congestion:** Cairo is experiencing traffic congestion that places it among the worst in the world. This has serious economic consequences and contributes to deteriorating air pollution conditions.
 - (b) **Poor passenger transport system.** Cairo relies on undeveloped, overcrowded and unreliable passenger transport services. Their main positive characteristic is their low fares. For those services that are still operated by the public sector, this results in unsustainable subsidies, and for private services that try to compete with the heavily subsidized public services, the resulting fares are commercially unsustainable. The most obvious outcome is deteriorating service quality. Public buses are poorly maintained and many are out of service, while private operators are restricted to small vehicles without the means to replace them. The large number of operators and lack of an

⁶ Ibid, p 4.

⁷ Ibid, p 5.

⁸ Ibid, p 74.

institutional framework has led to a lack of integration among passenger transport modes, making already unpleasant traveling conditions worse than they need be.

- (c) **A high accident rate:** The road transport death rate in Cairo is very high. At least 1,000 Cairenes die each year in motor vehicle accidents, more than half of them pedestrians, and over 4,000 are injured.
 - (d) **Air and noise pollution:** Mobile source air pollution in Cairo is serious both with regard to particulate matter as well as noxious chemicals. Noise levels are high and aggravated by excessive aging vehicles fleet and subsequently higher operating costs. Vehicle inspections that should limit exhaust gas pollution are mostly ineffective.
 - (e) **Institutional weaknesses and fragmentation:** Like many other cities experiencing rapid population growth and even faster motor vehicle growth, Cairo suffers from fragmented and inadequately developed institutions to deal with urban transport problems.
 - (f) **Inadequate financial arrangements:** Overlaying all of the above problems are inadequate financial arrangements resulting in under investment in transport facilities, especially public transport systems; inadequate cost recovery and consequent excessive subsidies for urban passenger transport systems; highly subsidized pricing of gasoline and diesel fuels which favor less efficient private transportation; and inadequate participation of the private sector in financing urban transportation infrastructure and services.
- 1.6 To address the transportation problems facing Cairo, government authorities have embarked on an ambitious program to expand the metro system and have commissioned a study to expand the expressway system under public-private partnership (PPP) arrangements. In addition, the Government is improving the methods of administration and funding of urban transportation programs and investments. However, studies commissioned so far have dealt more with major investments rather than with operational, institutional or financing problems. The new government in office since December, 2004 is intending to deal with urban transport from a very pragmatic and comprehensive perspective that includes substantial institutional reform, all in the context of an holistic strategy.

CHAPTER II

ORGANIZATION AND OPERATION OF PUBLIC TRANSPORT SYSTEMS

A. Poor Performance of the Public Transport System

- 2.1 There have been recent major shifts in the means of travel in Cairo. The private car is becoming the preferred mode of travel for an increasing percentage of Cairenes, and among the remaining public transport users there has been a shift from formal buses to taxis and informal minibuses. Failures to keep regular bus services updated in terms of quality and regularity has resulted in a fall in their share to just over 20% from almost 40% in only 10 years despite low fares. Similarly, tram services have been partially dismantled and remaining services, due to lack of investments and adequate maintenance, have deteriorated so far that they are of only marginal importance (Table 3). These losses to public transport have been made up partially by the metro system, but mostly by shared taxis and minibuses that now account for over 50% of all public transport trips.
- 2.2 As a result, currently, road based public transport is provided by a large and inefficient public company (CTA), a large number of small and informal minibus operating companies, and an even larger number of individually owned minibuses and taxis. Most cities have found that one large public bus company is not an efficient way of providing formal bus services (diseconomy of scale beyond a certain size), and that breaking that one large company into a small number of companies can bring significant operational improvements (in particular if contracted out to professional private operators). This is the experience in mega cities in the developed and developing world. The Cairo Transport Authority (CTA) has 42,000 employees to run 4,500 buses and its sister public sector operator has 7,000 employees to run just 900 buses. This represents 9 and 8 employees per bus – easily over twice the staffing ratios for an efficient bus companies.
- 2.3 At the other extreme, many cities in the developing world are still trying to find ways to deal with the myriad of operators of minibuses and shared taxis, so far with few successes. While minibus now fulfill an important role in the provision of urban public transport, among the problems they bring include disproportionate contributions to traffic congestion, air pollution, and road accidents. When individual vehicles are given a licensed to operate on a specific route, it is impossible to control the capacity available at specific times of day – all owners want all their minibuses operating all the time to generate as much revenue as possible, even when this means that an excessive number of vehicles are

operating at off-peak periods. Among those few, successful approaches to regulating minibuses have been those in which the many informal operators are brought into the formal system, and routes are allocated to small operating companies on a competitive basis, rather than licenses being given to individual vehicles to operate on a specific route. However this requires a system of route planning and allocation and subsequent regulation that until recently has been lacking in Cairo. However, the recent implementation of taxi concessions based on competitive tendering and the award of some minibus route licenses are indications that large scale tendering and regulation of minibus routes might now be feasible.

2.4 The existing mass transit system serving the GCR is very modest for an urban agglomeration of its size and population density, and expected population and economic growth:

- There are only two metro lines totaling 65km in length while similar sized mega-cities have much longer systems relative to their population:⁹
- The suburban rail system and tram systems are poorly developed and contribute little to system capacity. Nearly all of the mega-cities listed above also have extensive suburban rail networks;
- There are no bus priority facilities in the GCR, which are typically the lowest cost form of mass transit.

Table 2: Supply of Public Transport Infrastructure and Vehicles

City	Metro km/ 1,000,000 people	Buses/ 1,000,000 people
Bangkok	20	1,731
Mexico City	12	362
Teheran	4	636
Riyadh	-	81
Moscow	52	825
Sao Paulo	31	1,020
Paris	149	645
London	166	753
Tokyo	92	419
Seoul	16	965
New York	92	493
Cairo	5	193 ¹⁰

Source: Millennium Cities Database, UITP

⁹ By comparison the metro systems in similar sized cities are as follows: London (415 km), New York (371km), Moscow (340km), Tokyo (281km), Seoul (278km), and Paris (211km).

¹⁰ This number represents only full size buses. There are 20,000 licensed mini-buses in the Greater Gairo Region but as many as five times more in operation.

2.5 The very high patronage of the existing metro system, which currently attracts approximately 2 million passengers a day – about 20% of total passenger trips -- represents an impressive use of a relatively short system and indicates the merits of investing more in mass transit systems.¹¹

Table 3: Cairo Modal Split 2001

Mode of Travel	Daily Trips (millions)	% of Total Trips	% of Public Transport Trips
Metro	2.06	11.2%	16.6%
Suburban Rail	0.08	0.4%	0.6%
Light Rail (Tram)	0.18	1.0%	1.4%
Public Bus	3.06	16.7%	24.6%
Minibus and Shared Taxi	6.93	37.8%	55.7%
Other Public Transport	0.14	0.7%	1.1%
Private Transport	5.89	32.2%	n.a.
Total all Modes	18.33	100.0%	
Total Public Transport	12.44	67.8%	100.0

Source: Phase 1 Final Report, Volume II: GCR Transportation Master Plan, Volume 2 page 11.

B. Proposed Strategy: Building a More Efficient Public Transport System

2.6 Objective. The principal public transport objective is to provide efficient public transportation services using a greater variety of mass transit modes (buses, trams, metros) which meet the large transport demand in a cost-effective manner. To achieve this objective the public transport strategy is to:

- Restructure the bus system (including (including mini-buses) and promote professional private operators (formalize the informal sector and streamline the public sector)
- Promote high capacity bus-based systems by providing bus priority facilities in high demand corridors
- Pursue the implementation of priority metro lines as funds permit

¹¹ Line 3 will be 33 km and Line #4 will be 24 km in length when completed.

- Develop large capacity transit systems that are cost-effective and environmentally friendly such as rehabilitation and extension of the Heliopolis Metro.

Specific elements of the proposed public transport strategy are described below.

2.7 Organizing the bus system and promoting professional private operators. A proposed long term objective is that most road based public transport should be provided by private operating companies operating large capacity buses under route or area concessions, albeit with a minority role for some individual taxi operators. With most public transport being supplied by private companies, rather than by large public operators or a myriad of largely unregulated private companies, some order can be established in how that supply is provided. In implementing actions to achieve this objective, care should be taken to avoid implementing regulations with the sole or principle aim of controlling what the private operators can do without providing a regulatory environment with adequate capacity that gives a reasonable probability that new regulations can be enforced. Not taking account of the first would reduce one of the primary benefits of extending the role of private operations, that of innovation and risk taking, while not taking account of the second would result in any new regulations being ineffective

2.8 Restructuring and further reorganizing taxi services: The recent successful implementation of five new corporate taxi concessions has provided an indication of how the recommended strategy can be implemented. The next step in restructuring taxi services should be to bring the many individual taxi owners into the system. This would be achieved by encouraging them to form small companies or cooperatives and thereby accessing lines of credit for the purchase of new vehicles. The companies would also be required to comply with basic commercial practices applicable to all small companies, as well as with specific requirements relating to driver training and vehicle maintenance arrangements.

2.9 Minibus consolidation and regulation of services: Minibus operations have succeeded in filling a gap in the provision of urban public transport services that public operating companies have been unable to satisfy.¹² In doing this they have become integral and important players in satisfying the demand for urban public transport. However, in achieving thus success they have created many new problems and raised many concerns about the safety and impact on traffic congestion of their operation. Many of these concerns derive from the quasi-legal status of most minibus operations and the failure of the regulatory agencies to provide them with basic infrastructure (such as bus stops, parking places and land for terminals) as well as from the lack of implementation of existing regulations related to their driving behavior.

¹² Most taxi drivers have appropriate licenses, but most microbus drivers do not. There has also been a four year moratorium in issuing new taxi licenses but the current number of taxis is estimated to be about 60,000, double the number of registered taxis. Microbuses also require a route license but, since it does not have to be displayed, enforcement is almost impossible. Since February 1999 no new microbus licenses have been issued. There are 20,000 licensed microbuses in the Greater Cairo region but more than 80,000 are believed to be operating.

The new taxi concessions faced similar but more tractable problems to those of regulating minibuses and it is still too soon to see how well the design of the taxi concessions can be applied to minibus services. However, there is sufficient evidence from this experience and that of some of the Governorates in licensing companies to operate minibuses, to see how minibus services could be restructured and regulated. Fragmented ownership and poor operator discipline aggravate the situation. The main additional issues to be faced with minibus concessions are related to fare collection, vehicle occupancy and vehicles in service at particular times of day and days of the week. Part of the contractual obligation of a concessionaire would be to comply with the conditions of the concession, including the number and quality of vehicles in service, and with fare policy. Regulation of minibus concessionaires is more problematic than of taxis, as they often have a near monopoly of services on a particular route, and users have few if any alternative service options. Stricter regulation will also give operators a more secure basis on which to plan their future actions, encourage investment in larger and better vehicles, encourage consolidation of service providers into established companies, and to provide better organized and disciplined public transport services for users

2.10 Restructuring public bus companies: One of the reasons that minibus services have come to dominate the supply of public transport is the failure of the operators of regular bus services to satisfy the demand. This failure is attributable to a variety of causes; some of them are specific to the circumstances of Cairo, others more generic to all large publicly owned passenger transport operators. Most cities have implemented changes in the way that conventional bus services are provided, giving a much greater role to private operators. The process by which this has been achieved usually starts with a break down of the large publicly owned operator into several area based operators. This has several advantages.

First, there are few economies of scale above that of a single bus maintenance garage, and the most efficient size for a maintenance garage is one that maintains no more than 500 buses, often many fewer. Not only is there a lack of economies of scale above this size, there are many diseconomies of scale, particularly of management ability. Second, the management of a smaller operation can be more in touch with the transport needs of local communities, and can respond better to these than can a municipally managed operation. Third, management can be in closer touch with and better respond to the operational practices of their own staff. In addition, local authorities have a much better basis on which to assess performance of its bus operations, as it can compare the performance of area operators against each other. This is particularly true when there is duplication of operations on some routes between routes served by more than one operator.

The proposed strategy therefore includes the breakup of CTA and GCBC into smaller companies, each based on one particular maintenance garage, and with each company being responsible for a few routes that compete directly with those operated by other companies. This proposal is similar to that in the TMP to commercialize CTA. If this restructuring of the two companies does not result in the expected efficiency gains within

a few years, the size of the new companies is more amenable to concessioning their services to private operators than that of the current companies.

An alternative strategy would be to go directly to the concessioning of all routes currently operated by CTA and GCBC. This would have the merit of avoiding an intermediate stage, often one at which reforms become stagnated and block achievement of the full benefits of reorganization. However, such a strategy would have the risk of being too radical and generating opposition, as well as having a much higher risk of mistakes being made.

The proposed strategies will need to be further explored, assessed and subject to a more rigorous evaluation of their feasibility and required accompanying measures in the specific context of GCR.

2.11 Restructuring of bus routes and integration of public transport systems: Another advantage of the proposed Strategy is that it will give time for a review of the bus route structure and the opportunity to make substantial changes. As restructuring of mini-bus services is also part of the Strategy, review of their route structure can accompany review of the conventional bus routes, so that each route can be assigned to the vehicle type most appropriate to its demand pattern. Particularly important in planning the new networks will be the use of more bus services as feeders to the metro and light rail systems which over time will become the backbone of the public transport system of the GCR. An important consideration in network planning and service integration will be integration of bus fares with rail system fares and its accomplished in a public transport system with both public and private sector operators.

2.12 Bus Priority Facilities: Bus priority facilities are used in most large cities, including those which have extensive metro systems such as London and Paris. The facilities can include a wide range of measures, from design of intersections including intersection signals to give priority to buses over other traffic, through bus only lanes that are segregated from other traffic lanes, to full Bus Rapid Transit (BRT) systems. BRTs have many features in common with rail bases systems but are much less costly. Among their common features includes their possible concessioning to private operators and the ability to separate responsibility for infrastructure from that for operations. Their capacity is rather less than that of Light Rapid Transit (LRT, or tram based systems) but can still reach 20,000 passengers per hour under favorable circumstances.¹³ The GCR currently lacks any system of bus priority facilities. Bus priority facilities less than full BRT should be widely implemented as part of the proposed Strategy. To achieve their full benefit, their introduction needs to be accompanied by measures that ensure compliance with the facilities by other road users. Without the measures, bus priority measures achieve little.

¹³ The proposed 34 km busway on the “West Wing” corridor, is estimated to cost LE 586 million (US\$ 98 million) or LE 17.2 million (US\$ 2.9 million) per kilometer, as compared to about LE 350 million (US\$ 70 million) per km for metro improvements and LE 140 million (US\$ 31 million) per km for Supertram Line #1. (See GCR Transportation Master Plan, Phase II, Volume I, page 26.)

Serious attempts should be made to implement candidate bus priority facilities at locations already identified in the GCR Transportation Plan and in other possible locations. For example, the proposed “West Wing” corridor connecting central Giza with the 10th of October Satellite City and the “Traffic Management Program along the Metro 4 Corridor” both contain proposals for exclusive busway facilities.

2.13 Capital Investments in Public Transport Systems. Beyond organization and operation of public transport systems, which is the subject of this chapter, the public transport strategy envisions substantial capital investment as funds permit. Especially recommended are investments in the following which are described in greater detail in Chapter 3:

- The Heliopolis Metro
- The Commuter Rail System
- Extensions to the Metro system

CHAPTER III

INVESTMENT IN TRANSPORT INFRASTRUCTURE PRIORITY

INTRODUCTION: PRIORITY DECISIONS

3.1 Given the scale of metropolitan Cairo, the high population growth rate, and the very high urban densities, development of the mass transit system is a major feature of the proposed Strategy. One of the strengths of the Transportation Master Plan was its focus on development of mass transit systems and the recognition of their importance in a strategy for addressing urban transport issues in GC. The TMP demonstrated the investment in public transport infrastructure should be substantial and include a mixture of metro, tram/light rail, commuter rail, and BRT, each of which would contribute substantially to the task of moving greater numbers of people in a very cost effective and environmentally friendly-way.

3.2 The cost of investments proposed in the TMP for the period 2002 to 2022 appear to be high at about U\$17 billion, but when expressed as a % of the gross income of the metropolitan area over the same period, it appears to be quite low at only 0.5%. Although there are no international “norms”, recent analysis of data in the UITP database by consultants working for the Government of France have estimated actual average investment in transport infrastructure in cities is about 1% of city GDP, and assessments by the World Bank of the transport investment needs in some cities in East Asia to be about 3% of city GDP.

3.3 Of greater concern is the 45% of expenditure that is allocated to Expressways, indications of a strategy of investing in roads to escape from the problems of traffic congestion, a strategy that has rarely been successful and usually changed in favor of investment in public transport and demand measurement to discourage increased use of private cars. Also of concern is the small investment proposed for Priority Bus Facilities.

Table 4: Transport investments proposed in the Transportation Master Plan for 2002-2022

	Million US\$	Share of investment
Mass Rapid Transit (Metro)	2,725	15.7%
Tram and Supertram	1,475	8.5%
Suburban railway	2,550	14.6%
Buses	1,100	6.2%
Priority Bus Facilities	500	2.9%
Nile Ferry	10	0.1%
Regional Roads	325	1.9%
Primary Roads	325	1.8%
Intersections	525	3.0%
Expressways	7,875	45.3%
Total	17,410	100.0%

Aligning Priorities with Strategic Objectives and Financing Capacity

Priority Public Transport Investments

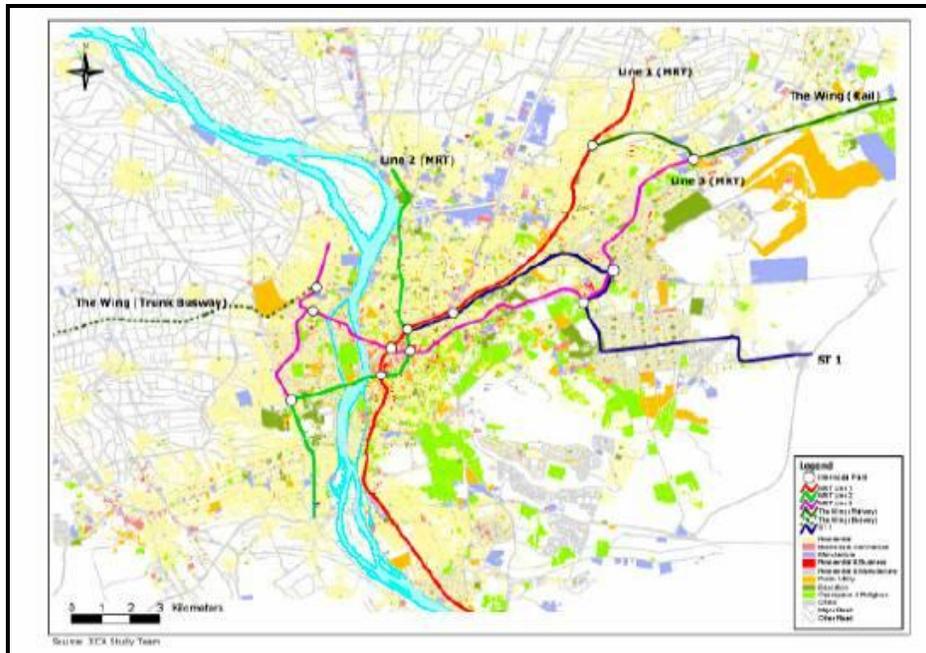
3.4 The main functions of the mass transit systems to be included in the proposed Strategy would be linking new towns on the western and eastern limits of the GCR. The main features would include:

- (a) Completion of 22 km of the committed 3rd Metro line currently under construction;
- (b) Upgrading and extension of the existing Heliopolis metro line from Nasr City to the Cairo city center (a distance of 19 km)
- (c) Planning, construction and concessioning of a 34 km BRT linking the 6th of October new town with central Giza, and;
- (d) Commitment to and construction of a 46 km railway linking the 10th of Ramadan new town with central Cairo.¹⁴

3.5 Of these projects, only the construction of the 3rd metro line is committed. Review of the current situation in GC showed that commitments to, and funding for, the other three projects are still high priorities in the proposed Strategy.

¹⁴ Transportation Master Plan and Feasibility Study of Greater Cairo Region in the Arab Republic of Egypt; Phase 1 Final Report, Volume III: Transport Master Plan, November 2002, page 4-162.

Figure 1: Public Transport Infrastructure Plan for 2012



3.6 In respect of further development of urban rail services up the year 2022, the TMP recommended:

- (a) Extending the 2nd metro line 6 km further north,
- (b) Extending the 3rd metro line 12km to the Cairo airport,
- (c) Building a 4th metro line of 27 km from the pyramids passing through the east side of the Cairo central business district and extending northward to Port Said Street,
- (c) Upgrading the busway linking 6th of October to central Giza into train service, and
- (d) Implementation of two additional Supertram routes with a total of 31 km in northeastern Cairo through Heliopolis.¹⁵

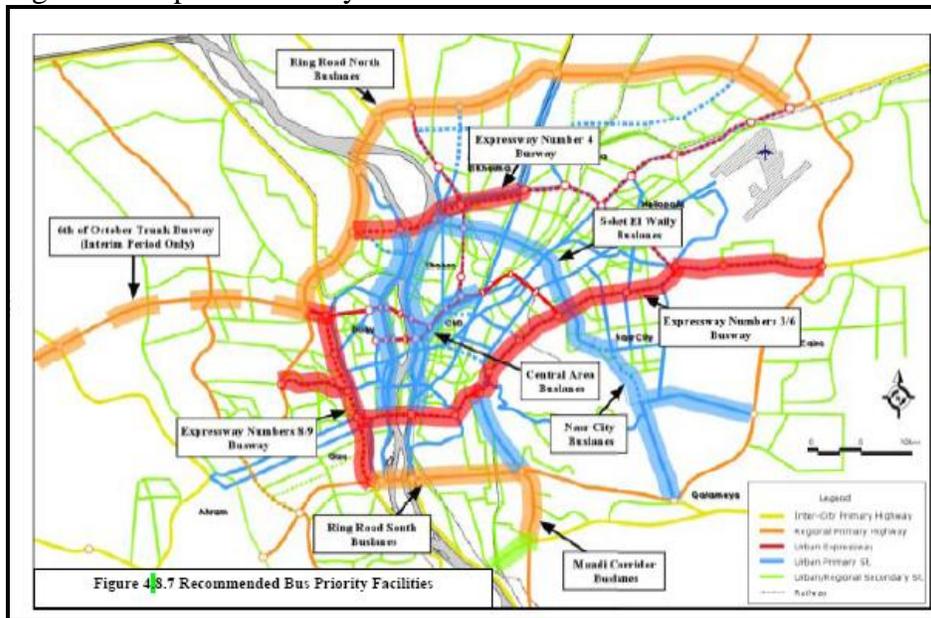
3.7 Each of these proposals should be further studied and included in the proposed Strategy if they demonstrate their cost effectiveness in supplying high quality

¹⁵ Transportation Master Plan and Feasibility Study of Greater Cairo Region in the Arab Republic of Egypt; Phase 1 Final Report, Volume III: Transport Master Plan, November 2002, page 4-144,160.

passenger transport capacity at least cost and if funding for them, from either public or private sources, can be assured.

3.8 Busway Corridors: The TMP also identified a number of corridors for consideration for BRT facilities by 2022 where travel demand is not expected to reach levels warranting “higher order” rail modes.¹⁶ The proposed facilities include some BRTs on regular arterial streets, and others on limited access expressways. These proposals merit equal consideration with those for fixed rail systems for inclusion in the proposed Strategy.

Figure 2: Proposed Busway Corridors



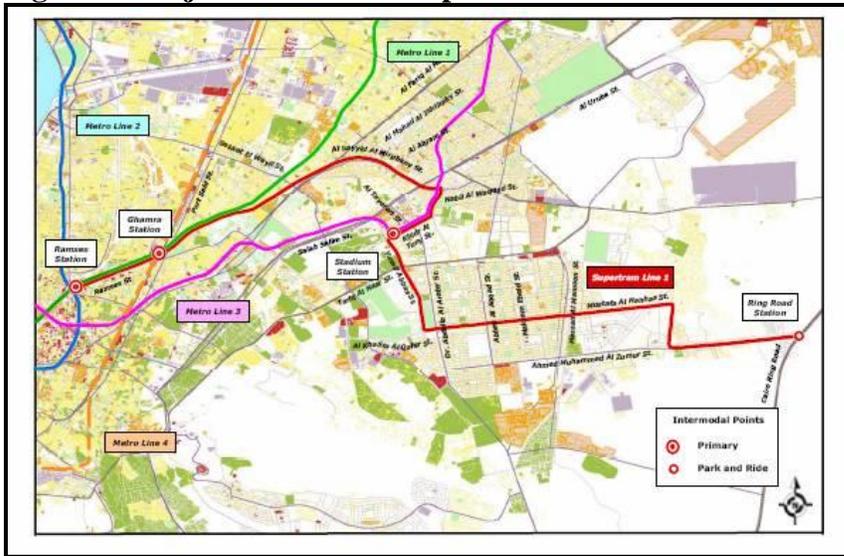
3.9 While the public transport infrastructure investment proposals in the TMP have logic to their inclusion and together make a plausible solution, individually and in total they are very costly, and funding is uncertain. Even the projects for which private investors have shown an interest, their high cost and low revenue generating potential indicates that substantial public funding would also be needed. Under these circumstances, it is particularly important to be certain that the proposals offer the least cost solution to addressing the transport supply conditions. Except the extension of the Metro Line 2 and the completion of Metro Line 3 (just started), the subsequent development of Line 4 appears particularly costly and merit further consideration of less costly alternatives before commitment to it is made.¹⁷

¹⁶ Ibid , page 4-189.

¹⁷ Line #1, which is 44 km in length and mostly at-grade, is sometimes called the “French Line,” cost \$585 million was comparatively inexpensive as most of this line consisted of upgrading an existing commuter

3.10 Cost Effective Mass Transit Systems to be considered. While substantial public sector investments for expanding the public transport system are proposed as part of the urban transport strategy as resources become available, it also follows that assessments of investment priorities should be based on considerations of the costs and benefits of the investments. This was done for most of the major investments included in the TMP, but the considerations did not include full consideration of least cost alternatives or fully take account of the overall investment constraints for urban transport. Based on currently available information, the following two proposals appear to be the highest priority investments in public transport infrastructure:

Figure 3: Project Location of Super Tram Line



I

(i) Upgrading and Concessioning of Heliopolis metro line. While the full upgrading of the existing Heliopolis tram into a “Super Tram” would be too costly as currently planned, it could and should be implemented in stages as funds become available.¹⁸ Private sector funding for some of the operational investments, especially new rolling stock, should be sought as part of the proposed Strategy. A private investor/operator would be best placed to maximize the revenue generating potential of the service. So the strategy recommendation is that the Super Tram Line 1 be considered a priority project, to be implemented with a mix of public and private investment and private operation as a concession bearing the risk of revenue generation.

rail line. The approximate cost of Line #2, which is 22 km in length, is \$3 billion. Line #3, which is 34 km in length and is currently under construction is estimated to cost LE 13.3 billion (US \$ 2.9 billion), and line #4 at 27 km in length is estimated to cost LE 9.4 billion (US\$ 2.1 billion) in 2002 currency. See page 4-169 of Phase 1 Final Report, Volume III, GCR Transportation Master Plan.

¹⁸ Super Tram Line #1 is estimated to cost LE 2.67 billion (US\$ 445 million) as of September 2003.

(ii) Incremental Improvements to the Commuter Rail System. The commuter rail system currently carries less than 1% of total public transport trips in the GCR. This small market share could be significantly increased at modest cost by selective upgrading of rolling stock, improved integration with bus and metro services, and operation of the commuter lines as a revenue risk sharing concession. This will require a feasibility review to design a demand driven commuter rail system along with required priority public/private investment arrangements.

Road Network Priorities

3.11 The road network of the GCR is hundreds of kilometers in length ranging from narrow and meandering streets, which provide mostly local land access, to wide and elevated expressways, which serve the larger metropolitan region. Most of the inter-city roads outside of the Cairo Ring Road are under the responsibility of the General Authority for Roads, Bridges, and Land Transport (GARBLT), which is part of the Ministry of Transport. All other roads, with the exception of roads in the new communities are under the jurisdictions of the respective governorates. The Ministry of Housing, Utilities and Urban Communities (MHUUC) are responsible for roads in the new communities. (See Figure 13).

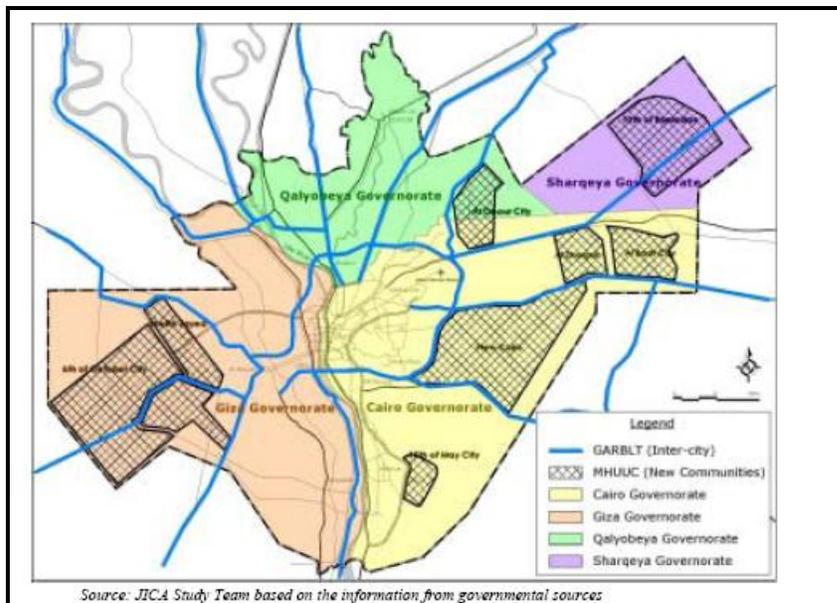


Figure 4: Administrative Classification of the Road Network

3.12 These roads collectively represent billions of LE of fixed investment and comprise by far the largest share of total transport assets in the Greater Cairo Region. Not only are roads critical for private vehicle operations, they are essential routes for most public transport operations as well. Beyond their importance as transportation corridors, urban roads provide the rights-of-way for most urban utilities and drainage.

3.13 The challenge will therefore be to secure sufficient funds to maintain and develop the crucial road network of the GCR, while at the same time not divert scarce public funds from the public transport systems which, according to the strategy offered in this paper, ought to remain the top strategic priority for transport investment in the Cairo metropolitan area. Road system expenditures must be made with this observation in mind.

Management Strategy for Cairo Roads Infrastructure

3.14 **Functional Road Classification and Institutional Responsibilities:** The TMP highlights the importance of functionally classifying roads in Greater Cairo Region. While two ministries and the respective governorates have their respective functional responsibilities with regard to the overall GCR road network, (para 47), the proposed Strategy is to functionally classify the road network of the GCR and, within this classification, to establish design standards, maintenance and rehabilitation guidelines, and most importantly funding priorities with respect to these different elements of the road network. (See Figure 14). This will require consultation and cooperation among the respective responsible governmental entities to ensure that the best possible funding priorities are set for the road network.

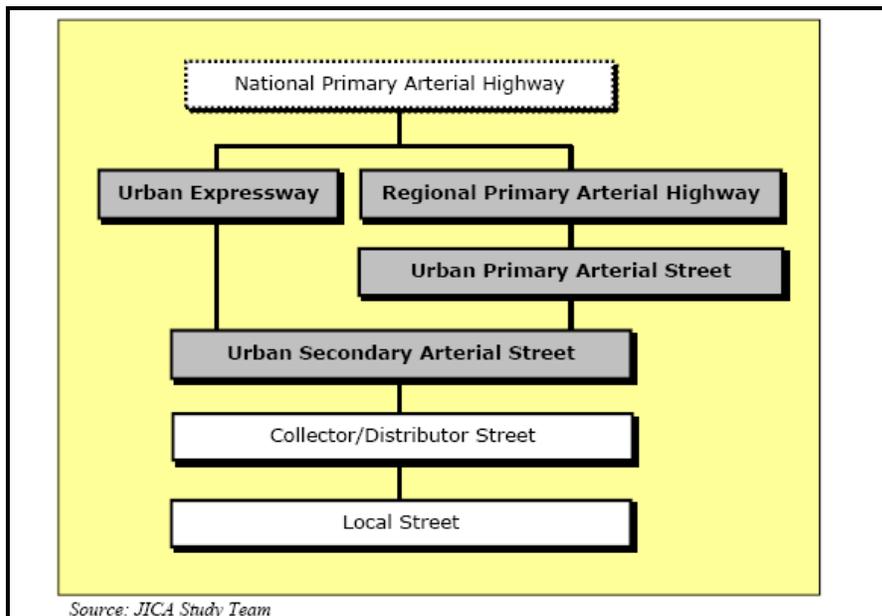


Figure 5: Recommended Functional Classification of the Road Network

3.15 **Road Maintenance:** The substantial fixed investment in the urban road network needs to be maintained as a priority measure prior to considering any significant improvement or expansion of this network. It is well recognized that delays in the timely maintenance of roads results over the longer run in increased maintenance or road

rehabilitation costs. The current allocation for maintaining the primary road network appears to be insufficient and hence there is a need to increase the maintenance budget for the GCR road network and for road maintenance funding to be consistent over time to ensure timely maintenance. The proposed Strategy is to invest at least 20% of the total roads budget in maintenance.

3.16 At Grade Arterial Road Development: The TMP and Urban Toll Expressway studies both identified a number of primary and secondary arterial road projects to be completed within the planning horizon of 2022.¹⁹ In addition a number of proposed “grade separation” improvements have been proposed to accommodate traffic at heavily used intersections.²⁰ These investments have a high cost and are not usually cost-effective in reducing road congestion or making the transport system more “person” than “vehicle” oriented. The proposed Strategy is therefore to reassess the priority of these investments in the context of the overall Strategic objectives.

3.17 Urban Expressway System: The most significant existing road development proposal, as set out in the GCR Transportation Master Plan, is for a major expansion of the existing grade-separated expressway system in Cairo. The proposal is to complete almost 100km (99.2 km) of toll road expressways by 2022, of which 17.6 km would be created by converting existing toll-free expressways to the toll system (see Figure 15).²¹ These developments would be in addition to the 95 km expressway ring road around Cairo which would be converted to the toll system. The toll road system would be developed and operated under public-private-partnership (PPP) arrangements. These proposals are maintained in the proposed Strategy, provided that it can be shown that the PPP arrangements do not divert public funds from higher priority mass transit improvements. The total construction and right-of-way costs for the toll expressway system are estimated at 11.75 Billion LE (about \$2.1 billion).²²

3.18 A careful practical assessment and testing of the relative shares of public and private sector funding of these roads ought to be undertaken prior to investing scarce public funds. The role of these proposed toll facilities as bus priority routes also should be ensured as a major design element.²³ Under the proposed Strategy, the distribution of funding between urban mass transit and urban expressway systems should be advised by the results of a more general project selection criteria based on the expected economic and social outcomes.

¹⁹ These are for roads that would be “at-grade” unlike proposed expressways which are either elevated or incorporate numerous flyovers at busy intersections.

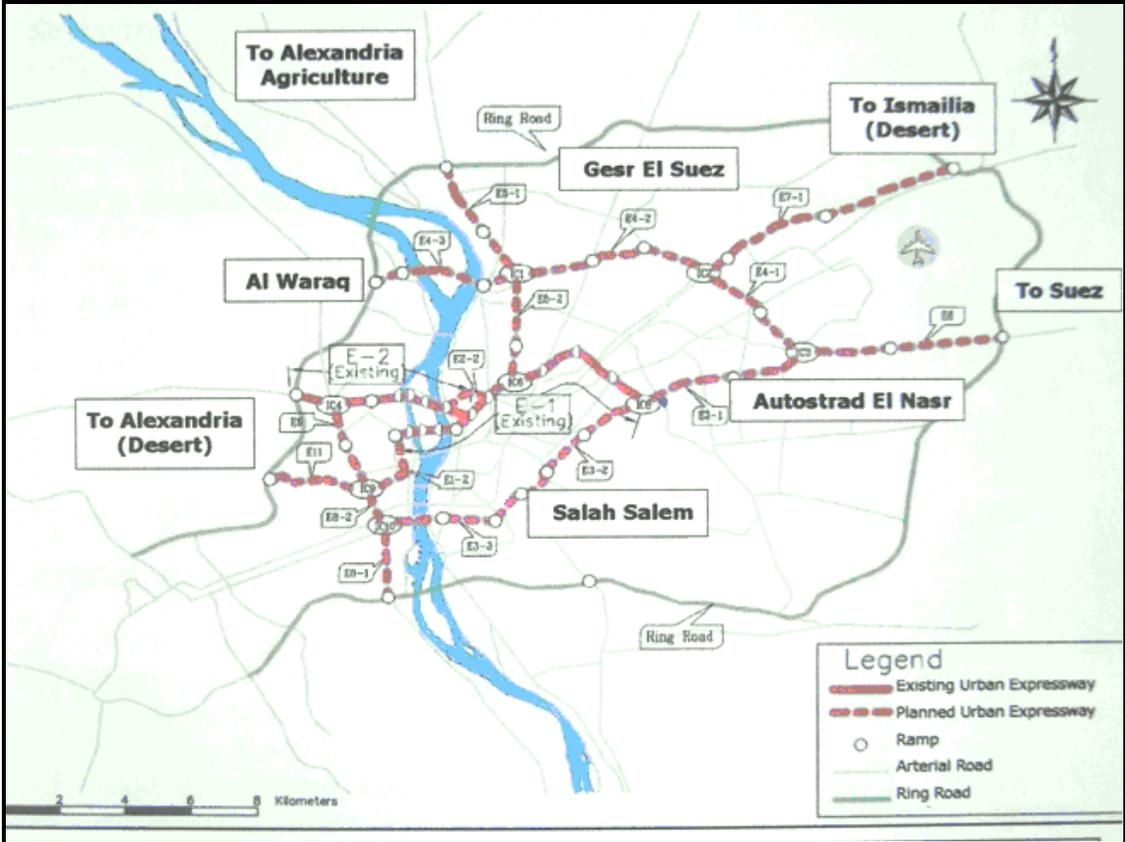
²⁰ Cairo Urban Toll Expressway Network Development Study, Main Report, pages 2-25, 2-26.

²¹ Cairo Urban Toll Expressway Network Development Study, Main Report, page 6-12.

²² This cost estimate appears to be very low and needs to be carefully checked.

²³ Sufficiently high tolls should be charged to keep traffic flowing smoothly which would obviate the need for exclusive bus lanes. The alternative of providing priority bus access to the expressways and exclusive lanes for buses might be utilized if tolls cannot be set at levels to permit free flow of general traffic.

Figure 6: Proposed Cairo Toll Expressway System



Source: JICA Cairo Urban Toll Expressway Report

CHAPTER IV

TRAFFIC MANAGEMENT

Traffic Management Issues

4.1. Traffic management and demand management measures are the least developed in comparison with other major cities throughout the world. Appropriately designed and strictly enforced traffic management could go a long way in reducing the severe traffic congestion, as well as making passenger transport operations more efficient and less costly and reducing the exceptionally high rate of accidents and fatalities. However for this to be achieved, a complete overhaul of the approach to traffic management will be needed, and travel demand management measures will need to be introduced on a significant scale.

Table 5: Road Deaths and Accidents by Governorate

Governorate	Injury Accidents		Fatal Accidents	
	2000	2001	2000	2001
Cairo	890	1711	327	394
Giza	2932	2533	468	414
Qaluybiya	461	429	449	509
Total Metro Cairo	4283	4673	1244	1317

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4.2 The most important traffic management issues we identified are described as follows. Traffic management in Cairo has failed to change in response to the changed circumstances of increased motorization and an expanded population. Together these have resulted in a much higher traffic density than current traffic management measures can deal with, resulting in a near break down of the system. Key elements of the current policy include these following practices:

- *The extensive banning of left turns.* This regulation results in many unnecessary vehicle-kilometers of travel. Moreover, it usually results in traffic having to pass through the same intersections twice, thereby reducing effective intersection capacity and increasing delays.

²⁴ Source: Cairo Regional Area Transportation Study, Technical Report 4: Traffic Safety and Environmental Issues, page 4-9, September 2002.

- *A lack of traffic signal control at intersections results in under utilization of intersection capacity.* This situation is aggravated by driving culture that requires drivers to give little consideration to other road users if they are to complete their travel in a reasonable amount of time. Most cities the size of Cairo have extensive centralized control of signalized intersections, a strategy that can be demonstrated to reduce travel time by about 20% as well as increasing the effective capacity of the road network
- *Lack of road signs and road markings.* If there are inadequate markings of traffic lanes, signs giving indications of traffic priority and regulations (such as “Stop” signs at intersections) and indications of how to reach destinations, drivers respond in ways that appear to minimize their own travel time, but which in practice increase travel times for all road users. Drivers cannot be expected to follow the disciplines that make best use of available road space if there are no road marking or signs to help them. Changing from the existing “rules of the road” to others that would be more advantageous to all road users is a very long term process, but it has a relatively low financial cost and significant benefits.
- *an operational philosophy of keeping traffic streams continuously moving* that results in little or no provision for pedestrian crossings of streets. Pedestrians are forced to cross the streets by passing through moving streams of vehicles, which is both unsafe and further delays traffic. While centralized signal controls also keep traffic moving, they break the traffic into blocks, giving pedestrians time to cross between the blocks of traffic
- *Inadequate facilities for Pedestrians.* There are few cities in the world where pedestrians are more poorly treated than Cairo. The lack of appropriately designated and safe pedestrian street crossings is notable throughout the metropolitan area. Commensurate with the lack of appropriate crossings, pedestrians are seen to be crossing streets at inappropriate locations and mingling with moving motor vehicle traffic. Moreover there are many locations where sidewalks are blocked by signs, kiosks, construction debris, and parked cars. This situation would not be tolerated in most other countries.
- *Inadequate junction designs.* Most road junctions in Cairo were designed when the numbers of cars and other vehicles were much lower. Simple junction designs that are suitable for low numbers of vehicles do not work well when the numbers increase to those currently experienced. Whether through lack of funding or traffic engineering skills, junction design has failed to change with the changing needs, so that most congestion results not from a lack of road capacity but a lack of junction capacity.
- *Lack of bus stops.* One of the most common complaints against mini-bus operators is their stopping wherever a passenger wants to enter or leave the vehicle, with little no consideration of the impact of the informal stop on the flow of other vehicles. Other cities have found that the location of bus stops that provide information on

the route numbers served and the places served by those routes, combined with the enforcement of their use, not only reduces impediments to the overall traffic flow, but makes the bus services more attractive to the users and more profitable to the operators.

- *Lack of facilities for and management of car parking.* Among the greatest impediments to pedestrian movement are cars parked on sidewalks, and so closely parked at the sides of roads that there is no space for pedestrians to cross the roads. Cars parked in inconvenient locations are also an impediment to vehicle flows and significantly reduce road capacity available for traffic. One of the reasons that cars are parked on sidewalks and on roadways where they impede traffic is that there are few other options available.
- *Bus priority facilities.* As in many other developing cities, initial attempts at measures to give buses priority in street and intersection capacity have not been successful. In part this is because they were not well designed, in part because other complementary measures were not taken, but most importantly, because their observance by other road users was not enforced.
- *Lack of institutional Capacity.* Addressing these traffic management deficiencies will require substantial improvements in the existing institutional capacity within the GCR. This will necessarily include at a minimum the creation of a civilian traffic management unit in the Giza Directorate, strengthening the existing traffic management unit in the Cairo Governorate, and the gradual devolution of the traffic engineering function from the traffic police to these civilian traffic units.
-

Box 1: A Brief Assessment of the Cairo Traffic Signal System

“There is an insufficient number of signalized intersections. At many intersections traffic lights are not visible because of low poles which make it difficult for drivers who are behind large buses to see them. Some traffic lights are not working properly. Currently during peak periods, almost all signalized intersections are manually controlled by traffic policemen. Manual operations are based on an assessment of spot conditions by visual observation by traffic policemen and/or information received via transceivers. However, it is rather difficult for this manual controlling technique to maintain an effective synchronization situation between intersections because it tends to result in a longer cycle length.”

Cairo Regional Area Transportation Study, Phase II Final Report, Volume II, page 4-

4.3 A high priority in traffic management for Cairo should be a comprehensive program to make conditions for pedestrians at least comparable to those in the rest of the world. A pedestrian treatment program would be particularly important in central business districts where pedestrian traffic should be seen as having priority. A program

for upgrading pedestrian conditions would naturally be combined with efforts to upgrade the traffic signal system. However, scheme that recognizes more rights for pedestrians will only be as effective as the enforcement of regulations that recognize those rights, and this will be particularly difficult to achieve as it will require a change in perceptions of pedestrians rights relative to those of other road users.

Figure 7: A Daily Scene Where Buses, Cars, and Pedestrians Compete for Space



Source: Al-Ahram Weekly, 31 March - 6 April 2005, issue #736

Recommendations for Improved Traffic Management:

4.4 The traffic improvements management program in the proposed Strategy consists of a range of low cost and highly effective measures practiced all over the world to traffic flow and safety on existing urban streets. These include:

- (i) A greatly expanded system of traffic signals, many of which would be linked to centralized traffic signal control systems. The benefits of Centralized Traffic signal Control (CTC) systems are much greater than the costs, and their implementation is one of the most cost effective measures that can be taken to improve traffic conditions. The urban transport Strategy gives high priority to implementing city wide centralized traffic signal control scheme

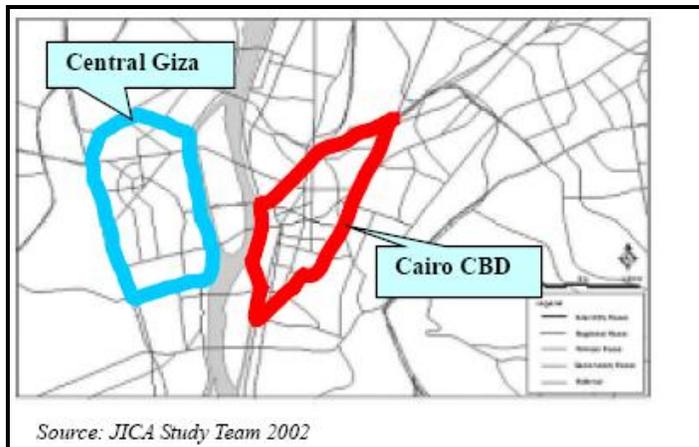
covering all three Governorates, but concentrating on areas where congestion traffic is worst. In addition to the use of CTC in the most congested parts of the metropolitan area, the Strategy proposes the widespread use of simple time based traffic signals throughout the rest of area. With both CTC and time based signals, realization of their benefits depends on adequate maintenance to keep them in operation. Maintaining such equipment and devices by the private sector should be considered as an integral part of the traffic management capacity to be urgently built in GC region.

- (ii) Road signing and marking. Although it will take time for the driving culture to adapt to the discipline of following traffic lane marking, until such markings are in place, the change cannot begin. Traffic signs giving indications of traffic rules are also necessary if drivers are to know what they are supposed to do and how to behave. The Strategy therefore proposes widespread use of road markings and vertical signs to encourage better lane and traffic discipline;
- (iii) Geometric improvements at intersection to make vehicle turns easier, Given that most traffic congestion results from lack of intersection capacity, and that the solution of grade separation is not usually feasible or cost effective, the proposed Strategy gives a high priority to improving the design of at grade intersections ;
- (iv) Sharing of road space between vehicles and pedestrians is prejudicial to the interests of both. The Strategy therefore includes the provision of multiple signed road crossings and improved sidewalks to enhance pedestrian conditions and improve their safety;
- (v) Expansion of on-street parking programs, but elimination of on-street parking that interferes with traffic flows;
- (vi) Bus priority facilities (bus lanes or exclusive physically separated lanes); recognizing the advantages to bus operators and passengers of measures to give buses priority in use of road space and intersection capacity, the Strategy proposes expansion of these facilities. However, to achieve their potential success, they need to be designed so as not to unreasonably impede other traffic (otherwise they will be ignored) and to be accompanied by parking constraints that keep bus lanes free of impediments.
- (vii) Clearly marked bus stops, indicated the routes and destinations they serve. One of the most effective bus stop systems is that used in Buenos Aires. Buses themselves are color coded by route, so it is easy for passengers to see from a distance whether the bus that is coming will go to their destination. Signs on bus stops are also color coded with the same colors, so passengers can easily know if they are waiting at the correct bus stop for their route. Further help is given by having the streets that are served by each route listed below the route

number and color code on the bus. Compliance by bus drivers with the system is helped by their knowing where their potential passengers are waiting. An adoption of this or a similar system for Cairo is included in the proposed Strategy.

4.5 Although these are described as independent measures, their joint effectiveness is much greater than the sum of their individual benefits. The proposed strategy is therefore to implement the individual measures as part of traffic management plans for specific areas and corridors. The prime, but not only, candidates for implementation of these area plans are the Cairo and Giza Central Business Districts for which integrated traffic management flows should be developed and influenced as strategic priority to alienate congestion in GC.

Figure 8: Central Giza and Cairo CBD as Focus Areas for Traffic Management



CHAPTER V

TRAVEL DEMAND MANAGEMENT

Absence of Traffic Demand Management

5.1 Traffic management measures as described in the previous Section are aimed at increasing and better using the capacity of existing streets, whereas travel demand measures are targeted at reducing vehicle use in congested travel periods and places. Travel demand management has not so far featured as a component of transport strategy in Cairo, which has been almost exclusively focused on attempting to satisfy demand for travel rather than to manage it. Even with a highly developed mass transit system, a well developed road system, and good traffic engineering measures, traffic congestion will continue to remain a serious problem without the application of travel demand measures. There simply is not enough space for roads in central Cairo and other high density parts of the metropolitan region to accommodate all motorists who may wish to travel there in private cars at peak travel periods.

5.2 Most demand management measures depend on charging for the use of scarce resources, particularly road and parking space, so as to deter the marginal road users from making their trip or by using the most efficient mode (public/private). The charging can relate to:

- (a) car ownership;
- (b) car parking, and
- (c) the use of vehicles on the streets

5.3 All these demand management measures have their uses in the context of Cairo. Given the lack of parking spaces and the high costs of adding additional spaces, charging sufficiently highly for parking spaces and strictly controlling the use of unauthorized parking spaces would be among the most cost effective demand management measures. New technology has made direct charging for use of limited road space feasible and is now being considered or implemented in a rapidly increasing number of cities.

Introducing Traffic Demand Policies

5.3 **Parking Management Strategy:** Management of both on-street and off-street parking space is an essential component of all travel demand management strategies. While parking spaces are needed in all areas of the city, and especially in high density commercial areas, their provision needs to be limited and priced so as to not overload the available road network. Many cities have moved from requiring all city center

developments to include enough parking space for all the users to restricting such developments to an absolute minimum of parking space. This change was on the realization that providing parking spaces encourages more use of cars and eventually overwhelms the ability to provide adequate road space.

5.4 Given that some privately managed on-street parking already exists in central Cairo, this practice could be extended by offering parking concessions in specific zones or streets on a competitive basis. Most off-street parking should be provided by the private sector under public-private-participation (PPP) arrangements. While the bulk of parking could be financed and administered by the private sector, the establishment of parking policies and regulatory controls would preferably be undertaken by a dedicated and competent government unit. Most major cities have now delegated the function of parking enforcement to authorized civilian agencies, freeing the police for more important traffic enforcement matters.

5.5 The proposed strategy includes the expansion of paid on-street parking programs (see Figure 10)²⁵ that will:

- Reduce unnecessary travel to congested areas (the key element of a travel demand management program);
- Improve traffic flow by removing parking spaces where they interrupt traffic;
- Encourage parking turnover (shorter term parking) which is good for abutting commercial businesses
- Become a good source of revenue for the city.

5.6 The provision of off-street parking spaces is also an important element of a parking demand management strategy. While off-street parking places are required, especially in dense urban areas, these spaces need to be carefully located not to encourage traffic congestion. In central city locations they might be priced relatively high to discourage those motorists who would have a reasonable public transport option. Outlying park and ride lots might be more favorably priced to encourage use of public transport services.

²⁵ Over 1000 on-street parking spaces are provided in Downtown Cairo where enforcement is guaranteed by physical restraints that prevent motorists from departing until full payment for parking is provided.

5.7 Road Use Charging Strategy: While appropriately priced and enforced on-street and off-street paid parking should be considered as the first element of a strategy to manage travel demand by private vehicle users, using pricing as a means of moderating the use of available road space is also advocated. This strategy should include (a) tolling selected roads, (b) considering the merits of area road pricing (ie charging for use of a network of roads in congested areas), and (c) increasing fuel prices and introducing fuel taxes. The following paragraphs provide some recommendations on how these three user charges schemes can be designed in GC.

(a) Toll Roads: The recent JICA financed study of a proposed Cairo Urban Toll Expressway System introduces the possibility of tolling major roads for the first time in the metropolitan area.²⁶ This proposal not only makes good sense from the standpoint of obtaining private sector finance for these roads, it also could be a good mechanism for regulating vehicle flows on these roads so that they do not reach congestion levels. To accomplish this objective, variable toll levels by time of day may be required. This strategy element should be pursued but careful consideration of the institutional arrangements for managing toll road development, operations and maintenance, as well as the financial feasibility of these investments will be especially important. (See Section VIII for further discussion of this topic).

(b) Area Road Pricing: Beyond pricing of specific road links, the concept of area road pricing is worth serious consideration for central Cairo. While this concept has not been widely applied throughout the world, it is receiving considerably increased attention with the successful implementation of the scheme in central London (see Box 1) and with the advent of electronic toll collecting facilities. The obvious advantage of this type of scheme, under which motorists pay for the privilege of driving into a congested area, is that it could free up an entire area, such as downtown Cairo or Central Giza from excess motor vehicle traffic. Moreover, it would free space for the pedestrian and more efficient deployment of surface public transport systems (buses, shared taxis, and trams). While area road pricing has been considered a substantial success in London, other cities including Singapore, 3 cities in Norway, and Rome among others have instituted area road pricing. A particularly good example with direct relevance and in closer proximity to Cairo is the Restricted Traffic Zone (RTZ) in Tehran, which utilizes manual methods for operation and enforcement. (see Box 2). This scheme demonstrates that high technology – of which Singapore is the leader – is not required to successfully operate an area road pricing system. What is needed is political will to introduce the system followed by diligent enforcement and capable institutions.

²⁶ Public-Private Partnership (PPP) Program for Cairo Urban Toll Expressway Network Development, Draft Final Report, Katahira & Engineers International, PwC Advisory, March 2006.

Box 2: Congestion Pricing in London

Since February 2003 the city of London has charged a fee of 8 pounds sterling (about \$14 equivalent) for driving private automobiles in its central area (8 square miles) during weekdays (7:00 am to 6:30 pm) as a way to reduce traffic congestion and raise revenues to fund transport improvements. This has significantly reduced traffic congestion (overall speeds have increased 37%), improved bus and taxi service, and generates substantial revenues. Approximately 110,000 motorists a day pay the charge. Payments are made at selected retail outlets, payment machines in the zone, by internet, and cell telephones at any time of the day. Owners of vehicles who have not paid are fined about \$130 equivalent. Public acceptance has grown and there is now support to expand the program to the west of the existing zone (see Figure 11) and other cities of the UK. This is the first congestion pricing program in a major European city, and its success suggests that congestion pricing may become more politically feasible elsewhere.

Box 3: Congestion Charging in Tehran

Tehran implemented a simple congestion charging scheme in 1981. A Restricted Traffic Zone (RTZ) of 19 sq. km was set up in the central city area. At the time, there was serious congestion and the scheme was easily implemented and accepted by the people. The scheme was subsequently extended to 31 square km and remains to this day. Currently, there are 65 gateways signed by overhead gantry signs on major roads and roadside signs on minor roads. Vehicles have to be pre-registered and pay an annual fee to enter the RTZ which operates between 06:00 and 17:30 hours during Saturday to Wednesday (the Iranian working week). The RTZ does not operate on the weekend (Thursday and Friday) or on public holidays. Currently, around 80,000 vehicles pay an annual fee ranging from US\$110 for government vehicles to US\$270 for private vehicles. About 40% of vehicles are government ones and pay the lower charge. As shown in Figure 12, over 0.5 million trips into the RTZ are made each day at an average of over 50,000 per hour. Buses, taxis, motorcycles and trucks making key deliveries (foodstuffs, for example) are exempt. Permits are issued on a needs basis. Annual revenue is estimated to be US\$6 million which is used for operation the RTZ and funding traffic improvements.

Operation and enforcement is manual. Vehicles display a paper sticker on their windscreen which is color-coded for each Iranian calendar year (March 21 - March 20). However, the starting month for each individual vehicle may vary and this is demarcated by hole-punches in the permit. The RTZ is enforced manually by the traffic police who staff selected gateways. However, the difficulties of enforcement mean that the violation rate (over 30%) is very high. The permit is not very visible, nor is the starting month. It is clear that the scheme is partially effective, as congestion has abated, but it could be more effective with improved enforcement.

The city is poised to extend the RTZ area to 51 sq. km and implement camera enforcement at the gateways which should reduce the violation rate. A review of the Feasibility Study has shown that the proposals involve installing In-Vehicle-Units (IVU) in the pre-registered vehicles and using two entry gantries. Equipment on the first gantry identifies the IVU by a dedicated short range radio communication system (DSRC). A digital sensor detector on the second gantry debits the IVU smartcard and radio waves verify the debit. If not valid or if there is no IVU then a camera on the first gantry photographs the rear license plate of the vehicle as it passes through the second gantry and the system sends a fixed penalty notice to the driver's address. This type of enforcement is similar to how Singapore enforces its congestion charging scheme.²⁷

²⁷ Draft Report on Traffic Management and Public Transport in Tehran, Technical Assistance and Study Program in Urban Transport, Islamic Republic of Iran, pp 12-13.

(c) **Fuel Prices and Taxes:** The cost of fuel and the taxation of fuel is another more indirect measure used by some governments to discourage excessive use of roads by private vehicles. (This is, of course, in addition to the more obvious use of fuel taxes to finance government investments and operations.) It should be mentioned that the opposite situation is true in Egypt where the price of fuels is highly subsidized. This under pricing has the adverse opposite effect by actually subsidizing the uneconomic use of private motor vehicles. Therefore, a very important element of the transport strategy should be a substantial increase in fuel prices and the eventual introduction of fuel taxes. (See Section X. “Financing Urban Transport” for more details).

5.8 **Recommended Physical Measures:** Another possible application of travel demand management in the GCR could be the application of “traffic cells” under which traffic is permitted to access an area but by physical design of the road system not allowed pass through. This might be particularly effective in special areas where roadways are not conducive to heavy through traffic. The “Islamic Cairo” district is one such area where this type of travel demand measure might be implemented. Informally developed residential areas also might be candidates for this type of demand management treatment.

CHAPTER VI

TRAFFIC ENFORCEMENT

6.1 Poor Traffic Enforcement: Given the lack of road space relative to the number of vehicles and the difficulties of adding more, improved enforcement of traffic laws and regulations should figure prominently in the urban transportation strategy for Cairo. There are very apparent and important gaps in enforcement including widespread disregard for parking restrictions, excessive mid-block pedestrian crossings, and disregard for traffic signals except (or even when) police are present. If traffic management and demand management strategies are accepted as priority measures to implement in metropolitan Cairo, it follows that the active supporting role of the traffic police will be essential to ensure that these schemes are adequately enforced.

6.2 Recommendations: Consistent with developments in other major cities, the traffic police should gradually move toward more mobile traffic enforcement with a view to enhancing their role in addressing traffic safety and in traffic incidence management (expeditiously clearing traffic accidents and other abnormal traffic events that could cause traffic congestion). This will mean the selective redeployment of police from stationary “point duty” at intersections. To accomplish these objectives, it may be necessary to provide the police with vehicles and other equipment in support of these enforcement activities, as well as providing appropriate police training to reorient traffic police operations.²⁸ More specifically, important areas of traffic enforcement emphasis as part of the transport strategy include the following:

(a) Traffic Safety. The paramount traffic enforcement activity should be aimed at reducing traffic accidents, especially those that cause serious injury or death. Particularly important will be greater emphasis in reducing pedestrian accidents which constitute a high percentage of all injury accidents, and in reducing speeding which is a primary cause of fatal accidents. To successfully address this issue it is anticipated that training and additional vehicles and speed monitoring equipment will be required.

(b) Traffic Incidence Management. It should be recognized that traffic incidents, including accidents and vehicle breakdowns, typically are the cause of a significant proportion of travel delays or congestion in urban areas. It is therefore important to equip the traffic police with suitable equipment and training to be able to

²⁸ This equipment might include cars/motorcycles for mobile enforcement, radar and similar devices for speed control, fully equipped vans and other equipment for quick accident investigation, and vehicle towing equipment to remove stalled vehicles.

expeditiously document and clear accidents and similarly to be able quickly clear all other traffic impediments.

(c) Accident Statistics and Reporting. The accurate and complete compilation of accident statistics and their timely reporting is an important traffic police function which needs to be substantially improved. This information can serve as the foundation for improved traffic safety programs as well as an input for determining where and what traffic management measures should receive highest priority.

(d) Parking Enforcement. A very important matter to resolve is the enforcement of parking restrictions. This will likely require changes to parking legislation and/or regulations. Another important matter to resolve is whether parking enforcement should be handled by the traffic police or alternatively whether this function could be handled by special deputized personnel, as is common in many cities, freeing the traffic police for more demanding traffic enforcement functions.

(e) Institutional Strengthening. Beyond a gradual shifting of traffic police operations in enforcement activities, it is recommended that the traffic engineering function currently provided by the police should be gradually relinquished to civilian authorities as is the practice in virtually all medium and large size cities in developing and developed countries. It must be recognized that police are not adequately trained for this increasingly complex engineering function, and that there is little prospect for this to occur in the future. By comparison, traffic engineering is being taught at the university level in Egypt but those persons who are trained in traffic engineering applications are typically not being hired by the public sector to pursue traffic engineering activities. This proposed shift of traffic engineering responsibilities to civilian authorities will permit the traffic police to concentrate solely on traffic enforcement.

CHAPTER VII

URBAN TRANSPORT INSTITUTIONS

Fragmented Institutional Set up and Poor Capacity

7.1 Many of the urban transport issues and inefficiencies described above derive from the lack of adequate institutional structures for serving the GCR in the urban transport sector. Many separate agencies of government at different levels are responsible for different modes of travel and various aspects (planning, design, operations, maintenance, and construction) of the urban transport system serving the GCR. The GCR Transportation Master Plan has identified 18 separate governmental entities and 4 additional non-governmental organizations that have a significant role in GCR urban transport (see Annex 4).

7.2 While it is common to have a large number of organizations dealing with urban transportation in major metropolitan areas, this is not inherently a problem if: (a) the designated roles of the organizations are appropriate, (b) adequate coordinating mechanisms are in place, and (c) the professional competence of the organizations are adequate to deal with pressing urban transport issues. It could be argued that in the GCR none of these 3 mitigating factors are adequately addressed. Among the institutional problems facing the GCR in the urban transport sector are the following:

- Overlapping Responsibilities -- In some cases institutional responsibilities overlap with ensuing competition or lack of cooperation. One example is the traffic management function of the Cairo traffic unit and the traffic police where the division of responsibility is unclear and where important proposed initiatives may be stalled or not pursued.
- Lack of Coordination Among Institutions -- Given the large number of entities concerned with urban transportation it is imperative that a mechanism is in place and active to ensure that the activities and investments of these various entities are adequately coordinated. A good example is the lack of adequate public transport system integration. At present there is no such active institution with sufficient clout to effectively act in this role. This may lead to sub-optimal use of public resources and most likely missed opportunities.
- Inadequate Priority Setting -- Due to the lack of an effective coordination and oversight function there is a lack of adequate priority setting for allocation of scarce transportation resources, especially at the metropolitan level. Allocation of

investment costs between agencies is inconsistent as are the accounting principles used by them. One result is that transport investments are not optimized, and often the impact of investments on operating agencies is not taken into account when they are made.

- Inadequate Handling of the Private Sector -- While the private sector has been increasingly involved in providing public transport services, the regulation of the private sector has been deficient in securing the appropriate type of services; moreover, not enough has been done to date to secure private sector financing of urban transport infrastructure and/or services.
- Organizational Inefficiency -- Some of the organizations, most notably the Cairo Transport Authority, are overstaffed and inefficient by any reasonable standard of accountability.
- Lack of Qualified Staff -- Underlying most of the above institutional problems are the lack of sufficient numbers of qualified professional staff to address the complex urban transport issues facing the GCR. For example, the traffic management unit located in the Cairo Governorate is understaffed and Giza to date has no civilian traffic management unit in spite of very severe traffic problems in both jurisdictions. This lack of capacity is observed in both public as well as private agencies and operators.

Strategy for More Efficient Urban Transport Institutions in Cairo

7.3 Urgent Need for an Appropriate and Competent Institutional Structure: An essential element for a well functioning of an urban transport sector in the GCR is to ensure that the institutional structure is appropriate and that the staffing is adequate in terms of skills, qualifications, and numbers. The few cities in developing and developed countries that have successfully addressed this need have either created a new metropolitan level transport agency that covers the area of several municipal jurisdictions and replaces some of their transport responsibilities with its own, or a joint agency that includes representation from each of the municipalities that make up the metropolitan region. The first of these tends to function more efficiently, if it can be established, as a metropolitan level agency has no conflicts of interest, whereas representatives of municipalities in the second solution often find it difficult to reconcile their municipal with their regional responsibilities and concerns. In any case, most large metropolitan cities the size of the GCR have opted for a metropolitan authority.

7.4 The proposed strategy for institutional development includes:

- (a) Establishing a High Level Metropolitan Cairo Transport Steering Committee (HLMCTSC). At the present time there is no active metropolitan mechanism for addressing major transportation issues of regional significance. Given the large number of institutions concerned with transport in the GCR with

their own priorities and agendas, there is a particularly urgent need to establish a high level steering committee at the metropolitan level for policy setting, coordination, and decision-making. More specifically a high level steering committee is needed to establish major transport policies, resolve cross-institutional issues, set investment priorities and identify funding resources for major transportation investments.²⁹ This committee could build upon the positive experience using a committee structure for guiding the work under JICA funded transportation master plan for the Greater Cairo Region. The committee might be composed of the Prime Minister (Chairman), Ministers of Transport, Interior, Housing, Finance, Local Administration and Planning, and the Governors of Cairo, Giza, and Qalubiya. Other governmental or non-governmental institutions might also be represented. This committee should meet as frequently as needed to accomplish its policy making, coordination and decision making functions. This might be a frequently as monthly and most likely not less than once quarterly to be effective. (See figures 10 and 11 for an overview of the recommended transportation institutional structures within the Greater Cairo Region.)

(b) Creating a Metropolitan Cairo Transportation Authority (MCTA). Beyond the creation of a metropolitan level steering committee for policy setting, coordination, and decision-making in addressing major urban transport issues, there is a need for a permanently staffed professional organization to act as the technical secretariat of HLMCTSC. In this role a Metropolitan Cairo Transportation Authority (MCTA) would propose for consideration by the HLMCTSC urban transport policies, priority investments, pricing policies, and financing arrangements in addressing urban transport issues, particularly with regard to public transport on the metropolitan level. Such an organization might be specifically empowered to: (i) prepare and update multi-modal transport plans for the Cairo metropolitan area, (ii) prepare operational and capital investment budgets for passenger transport and for major road investments, (iii) plan transit service networks and system integration, (iv) contract for service with public sector passenger transport operators, and (v) regulate and contract with private sector passenger transport operators.³⁰ Given these proposed functions, the MCTA would need to assume some of the existing responsibilities of the existing Cairo Transport Authority as described below. The MCTA organization might be funded, at least in part by passenger transport concession fees. Metropolitan-wide transportation authorities have been created in several major metropolitan areas and are being considered in many others (see Box 4).

²⁹ Alternatively this proposed committee might become part of a more broadly based high level committee that focuses on a range of metropolitan area development issues.

³⁰ These functions do not necessarily have to be performed by the MCTA but could be conducted by consultants or others under contract with the MCTA. This organization also could be empowered to operate some of the urban transport systems but it is suggested that it would be better for this organization to plan and regulate services provided by others rather than to mix this role with operations.

Box 4: Istanbul, Bucharest, and Tunis Metropolitan Transport Authorities

Recognizing the need to better plan and finance urban transport services and investments, to coordinate the policies and programs of the various entities that have a role in providing urban transport services and infrastructure, and to better regulate the services provided by the private sector, major metropolitan areas have created, or are considering the creation of metropolitan level transportation authorities. These are typically professionally staffed organizations which report to boards consisting of appropriate local and central government representatives. Three such examples of metropolitan areas which are currently considering metropolitan level transportation agencies are described below.

Istanbul. Officials of the Istanbul Metropolitan Municipality are proposing the creation of an Istanbul Metropolitan Transportation Authority for the purpose of planning and coordinating public sector investments in passenger transport, as well as the regulation of private sector passenger transport operators. There are 16 modes of public transportation in Istanbul including 3 local government operators (the public bus company; the operator of the subway, light rail, and trams; and the operator of fast ferries), 2 central government operators (the operator of the commuter rail service, and the operator of marine transport services), and over 50,000 private sector operators who provide 70% of all public transport trips. The board of the proposed Transport Authority will include officials from the central government, the Istanbul Metropolitan Municipality, and the private sector.

Bucharest. The Bucharest Metropolitan Region is studying the possible creation of a Transportation Authority with the assistance of World Bank finance and advice. The surface transport system is controlled by Bucharest City, the subway system is controlled by the Transport Ministry, and the private sector provides a significant proportion of all passenger transport trips. Unlike Istanbul, there is no metropolitan level government, so the interests of outlying urban areas must also be taken into account. The study will, in particular, make recommendations on (a) whether the Authority will be limited to a public transport planning and coordinating body, or one which has direct power in terms of regulating or funding public transport operations; (b) whether the Authority should own and operate public transport assets such as the metro or parts of the surface transport system; and (c) whether the Authority should confine its role to passenger transport or include other urban transport functions such as traffic management and overall transport planning.

Tunis. As in the case with Istanbul and Bucharest, a metropolitan authority is in the process of being established in Tunis. An organizational study has been completed and the Government taken the decision to create the Tunis Transport and Management Authority. The Authority's functions are to be largely confined to the public transport system (bus, mini-bus, light rail transit, and suburban rail). The principal roles of the Authority will be: (a) transport planning (preparing a transport master plan), (b) setting investment priorities among modes, (roads, public transport systems); (c) establishing pricing policies and subsidy distributions among public transport operators, (using performance based contracts with public sector operators); (d) regulation of public and private sector operators (with a view to integrating of the public transport system); and (e) awarding concessions for public and private sector public transport services (buses, rail and metro systems). The authority will also prepare and adopts by-laws affecting passenger transport, and prepare proposed public transport financing plans and government budgets for final adoption and realization.

(c) Undertaking Reforms in the Cairo Transport Authority (CTA). The JICA study outlined a number of problems with CTA operations including very low productivity, declining public transport service levels, and very large staffing (see Annex 2).³¹ It would appear that one solution might be to devolve the planning and regulatory function of the CTA to the proposed MCTA leaving the CTA solely as a public transport operator.³² A restructuring program should be developed to enhance CTA operations and increase its efficiency. This might include breaking down CTA bus operations into financially and operationally separate units organized around garages to encourage greater efficiency, possibly as a precursor to future privatization. The continued role of the CTA as the operator of the tram system also needs to be examined in light of possible private sector operation of this service under a concession agreement and the further possibility of combining the tram and metro (rail mass transit) functions into a single operation..

(d) Creating Parking Authorities (or departments). Consistent with the recommendations of the Cairo metropolitan region governors to address the parking problem, especially the provision of off-street parking garages, the creation of parking authorities or departments at the governorate level would be helpful. These authorities (or departments) could (i) develop a comprehensive parking strategy and parking feasibility studies in cooperation with the civilian traffic management units (see below), (ii) enter into concessions with private sector operators for building new parking garages, (iii) build and/or operate off-street parking garages where private sector participation is not deemed feasible, and (iv) contract out parking concessions for on-street parking. Funding for these units might be provided from the respective governorate budgets at an initial stage and later on from parking revenues.

(e) Strengthening / Creating Civilian Traffic Management Units. With few exceptions major cities around the world have created civilian traffic engineering and management units in response to increasing traffic volumes and consequent challenges. This has typically been done by transferring traffic engineering and management responsibilities from the police permitting the police to concentrate on the traffic enforcement. The only civilian traffic engineering unit in Egypt is located in the Cairo Governorate. This unit is understaffed for such a large city that is experiencing very heavy and congested traffic. This unit requires additional well trained personnel and should assume a greater range of traffic management responsibilities. A similar unit ought to be established, at a minimum, in the Giza Governorate. See Box 5 for a description of typical

³¹ The CTA has a staff of 42,000 most of which are assigned to run only 4,500 buses. The associated Greater Cairo Bus Company has a staff of 7,000 employees to run 900 buses. Source: Al-Ahram Weekly. 31 March - 6 April 2005.

³² There is an inherent potential conflict of interest in having a public sector operator of buses regulating private sector operators. Many metropolitan areas address this conflict by separating the operators from the regulator to assure objectivity in the regulatory process, especially in the allocation of routes.

functions of a traffic management unit, and Annex 1 for a description of the functions and staffing of traffic management units in other major cities.

(f) Assisting the Traffic Police in Mobile Traffic Enforcement. Traffic police operations in the Cairo metropolitan area focus on static “at-point” operations largely at intersections. A substantial proportion of these operations are focused at directing traffic at intersections. Assuming that improvements to the traffic signal systems can be implemented in the near future, it will be important to assist the traffic police to move into more mobile traffic enforcement with a view to enhancing traffic safety and traffic incidence management (quick clearing of accident sites as a means of facilitating traffic flow). This will require both equipment and training. This proposed shift in enforcement emphasis, and the gradual devolution of traffic engineering and management functions to civilian authorities, are substantial proposed reforms and would need to be advanced by top level traffic police with strong government support.

(g) Creating a Metropolitan Expressway Authority. The current JICA financed study of a proposed Cairo Urban Toll Expressway System introduces the possibility of tolling major roads and further proposes the creation of a Metropolitan Expressway Authority (MEA) both to promote the concept and to implement the scheme under public-private-partnership (PPP) arrangements.³³ Assuming the concept of tolling expressways is accepted for implementation in metropolitan Cairo, the creation of a special purpose body for managing the implementation and operation of such a scheme makes good sense. The governance of this body and its relationship to (or possible inclusion in) the proposed Metropolitan Cairo Transportation Authority (MCTA) would be worthy of additional study and reflection by the authorities to ensure coherent institutional setting in the GCR.

(h) Attracting, Retaining, and Training Staff. Beyond the proposed creation of competent urban transportation institutions, and in some cases the reorientation of the missions of other organizations, is the equally significant issue of attracting, retaining, and training qualified professional staff for addressing the complex array urban transport issues facing the GCR. It is clear that substantially greater attention and financial resources are required to develop sufficient staff competence within the key organizations to be capable of addressing this significant challenge. (See Figure 16 for a listing of professional skills required as proposed under the GCR Transportation Master Plan.). In particular, the University of Cairo and educational organizations could be called upon to assist in training staff. In some cases international training and practical experience also will be appropriate. A particularly important step to ensure institutional competence will be finding ways and means for offering adequate financial remuneration to attract and retain key staff. At present qualified personnel either

³³ Public-Private Partnership (PPP) Program for Cairo Urban Toll Expressway Network Development, Draft Final Report, Chapter 7, Establishment of Expressway System, March 2006.

elect not to join transport organizations or quit after gaining only modest experience. This later issue will require the allocation of the authorities if competent urban transportation utilities are to be set up with necessary skills and means to operate effectively.

Box 5: Functions and Responsibilities of a Traffic Management Organization

Division	Functions and Responsibilities
Traffic Management Policy	Formulate and Implement a city wide “Traffic Management Policy” to comply with objectives defined by the “city council” which would include, at least such areas as determination of (i) a functional road hierarchy; (ii) the appropriate balance between transport system users (private transport/public transport/NMT/pedestrians; (iii) priority programs for action and, (iv) a “5 year” investment plan”.
Traffic Research	Assemble/survey, monitor, analyze and evaluate all traffic and accident data to enable trends to be identified, problems quantified and traffic management plans and improvements to be prepared.
Traffic Management Plans and Improvements	Plan, design, implement, monitor, evaluate, fine-tune and continuously up-date traffic schemes and policies to realize the agreed Traffic Management Policy. The program would cover all motorized road based modes (cars, public transport, trucks, etc.) and all non-motorized modes (pedestrians, cycles). Plans and improvements would range from simple junction improvements or marking and signing programs through to far reaching city wide strategies such as extensive bus priority systems. Safety considerations are part of any scheme planning and design process but specific safety programs and accident counter measures would be a responsibility of the police.
Traffic Control Devices	Plan, design, install, operate, and maintain all traffic control devices including (i) traffic signal systems including computer controlled; (ii) motorist information systems; (iii) road markings; (iv) road signs and, (v) enforcement devices (cameras etc.)
Traffic Regulations	Formulate traffic regulations to realize the proposed Traffic Management Plans and Improvements for enactment by city government and for enforcement by the traffic police.
Parking Management	Prepare off and on street parking policies and programs including approval for the location of and access to parking areas proposed by others. Parking enforcement and administration (for example, where paid parking applies) would be carried out by a separate “parking authority” or equivalent.
Approvals and Co-ordination	Evaluate and advise city government on all schemes (e.g., new roads) and developments (developed both by public and private sector agencies and including major new land or building developments) which have a significant traffic impact to ensure that they are consistent with agreed traffic policy. In effect carry out traffic impact studies for all major development proposals.
Consultation	Consultation with the public and stakeholders on traffic policy and on the impacts of specific schemes and measures.
Budget	Preparation of an annual budget for submission to city government for (i) implementation of Traffic Plans and Improvement Schemes; (ii) traffic operations and maintenance of control devices; and, (iii) the continuous work of the traffic management agency itself.
<p>Notes:</p> <p>Not all functions would necessarily be carried out by the “traffic management agency” itself. For example, maintenance of traffic control devices and signals would most commonly be contracted out; in this case, the agency would assume the functional responsibility of supervision.</p> <p>Traffic regulation enforcement is not included as this is regarded as a traffic police function; however, there are cases where some enforcement, such as curbside parking, could be a traffic agency function and a “parking division” would be needed.</p>	

Figure 9: Proposed Professional Organization for Metropolitan Transport Functions

	Principal Responsibilities	Policy Functions	Professional Skills	Relationship to Other Organizations	Organization in Charge	Remarks
Urban Structure Planning	Prepare and maintain metropolitan structure plan.	Shape development structure, create basis for development controls	Land-use planners Environmental specialists, sociologists	Responsible to the MHUUC. Close cooperation with H.C for the strategic Transport Planning	GOPP – MHUUC	Existing
Strategic Transport Planning	Conduct strategic transportation studies. Prepare comprehensive transportation plans for the metropolitan area	Prepare broad strategies that other organizations should follow	Transport planners, economists, civil engineers	Responsible to the MOT. Coordinate with GOPP. Receives input from other transport organizations for the preparation of the strategies and plans.	- H.C - Urban Transport Planning Unit (ENIT)	- Existing - To be established
Traffic Management	Prepare traffic management plans. Review development proposals with traffic impacts. Operate traffic control and ITS Systems. Manage inspection and maintenance scheme. Monitor environmental impacts	Determine traffic priorities consistent with general strategy. Create parking and traffic management schemes	Traffic engineers, economists, parking specialists, electric engineers	<i>Regional Level</i> -Responsible to the Ministerial Committee for GCR Transportation. <i>Local Level</i> - Responsible to each Governorate Must work in coordination with police departments.	- <i>Regional Level</i> - CMTB - <i>Local Level</i> – ZTEB	-To be established - To be established
Public Transport	Plan and regulate public transport systems including buses, trams & light rail, taxis, and metros. Coordinate implementation	Prepare passenger transport policies consistent with strategy and financial capabilities. Set parameters for procurement agency	Public Transport and regulatory specialists	Responsible to the Ministerial Committee for GCR Transportation. Should be separate from any passenger transport operations	CMTB	- To be established
Traffic Enforcement	Enforce traffic regulations. Manage traffic events and incidents. Collect accident data	Collaborate in traffic management system design. Enforce traffic management policy	Police Officers	Traffic police provide traffic accident and traffic incidence information to MTB and ZTEB	Traffic Police	Existing
Road Design Construction Maintenance	Designing, constructing and maintaining roads and streets	Maintenance prioritization	Civil Engineers	Responsible to the Governorates. Work closely with MTB and ZTEB	Road Departments in the Governorates	Existing
Traffic Safety	Road traffic safety strategy. Coordinate all departmental inputs, including those from health, education, etc.	Analyze safety data. Orchestrate inter-departmental collaboration to implement strategy	Statisticians Traffic engineers	Responsible to the Ministerial Committee for GCR Transportation. Relationship with health authorities necessary	CMTB	- To be established

Source: "Cities on the Move – A world Bank Urban Transport Strategy" modified by JICA Study Team ZTEB- Zone Traffic Engineering Bureau

FIGURE 10

Proposed Metropolitan Cairo Transportation Organization

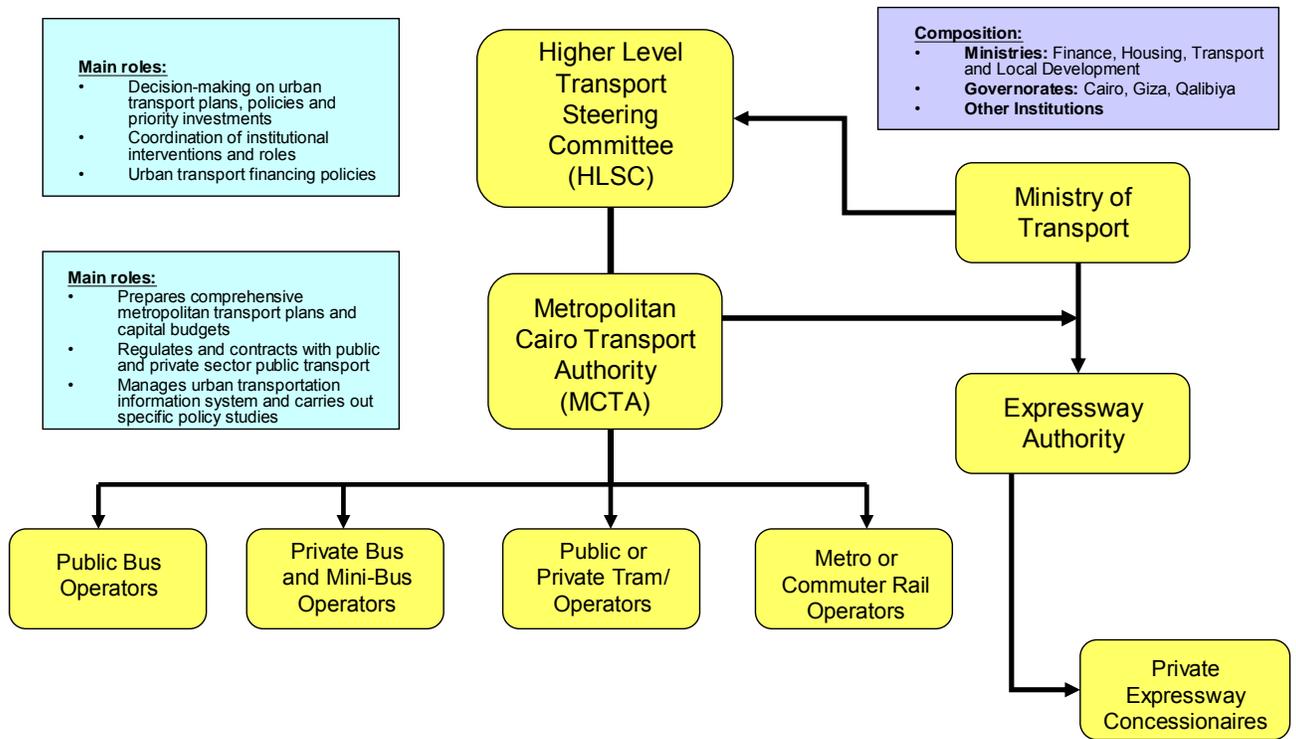
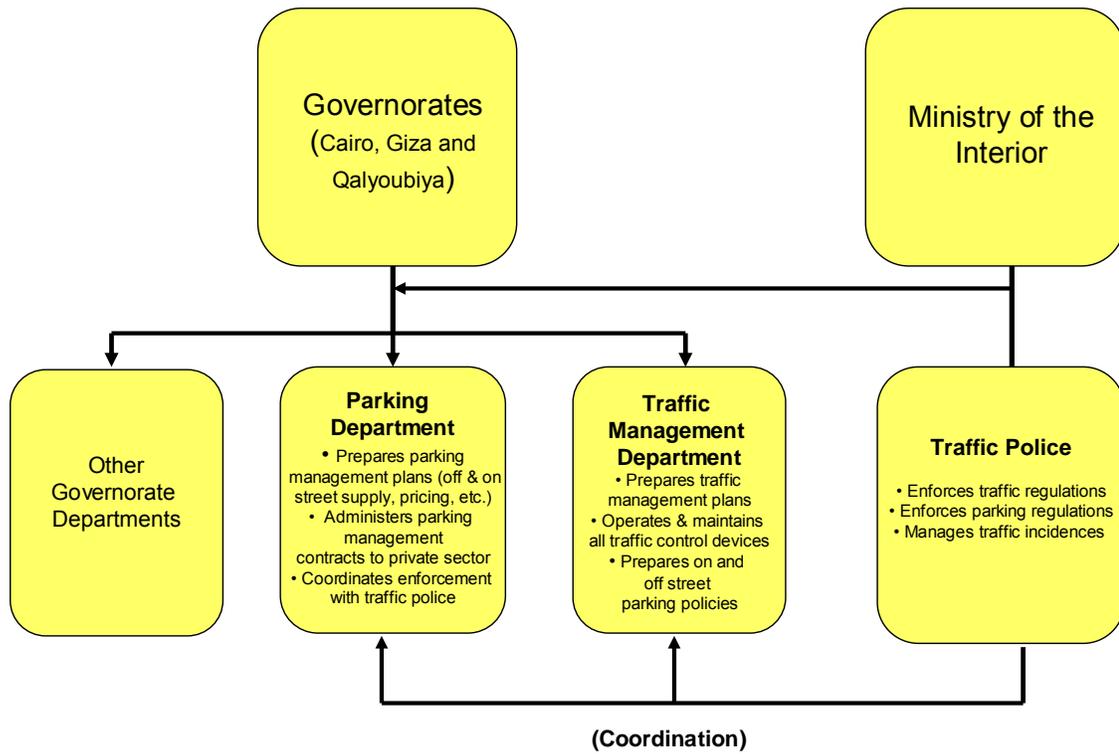


FIGURE 11

Proposed Governorate Level Transport Organization



CHAPTER VIII

FINANCING URBAN PUBLIC TRANSPORT

Lack of Financing Sustainability

8.1 **Affordability is assured at high fiscal and external costs.** Affordability is the ability to use public transport without significantly affecting the capacity to make other expenditures of importance under normal living conditions. By keeping all its public transport fares very low, Cairo has been one of the most successful cities in making its public transport services affordable, but this has come at a high cost in terms of subsidies, transportation time, pollution and lack of investment in improved services. It is now questionable whether keeping all fares low but enduring the consequences of poor quality and inadequate quantity is the best way of making services affordable to low income groups.

Table 6: **International comparison of the affordability of urban public transport**

City	Fare for 10km travel (PPP U\$cents)	Affordability Index	
		Average	Bottom Quintile
Sao Paulo	130.1	11%	107%
Riode Janeiro	125.4	6%	63%
Brasilia	106.8	6%	59%
Capetown	75.8	4%	38%
B. Aires	87.6	4%	26%
Mumbai	112.2	9%	23%
Kuala	121.6	5%	22%
Mexico City	39.3	3%	19%
Manila	63.0	5%	17%
Amsterdam	226.6	6%	16%
Moscow	84.6	4%	15%
Warsaw	142.5	4%	11%
New York	200.0	3%	10%
Los Angeles	160.0	3%	10%
Chicago	180.0	3%	10%
Singapore	130.3	2%	10%
Beijing	55.1	3%	9%
Seoul	85.5	4%	9%
Shanghai	55.1	2%	6%
Cairo	26.1	3%	6%
Budapest	89.3	3%	6%
London	116.4	2%	5%
Prague	88.0	2%	4%
Bangkok	32.2	1%	4%

8.2 There is evidence from many cities, including Cairo³⁴, that people on moderate incomes are prepared to pay significantly higher fares for better services. Many cities have implemented other strategies that involve directed public transport subsidies for people on low incomes.

8.3 Inadequate and congested urban transport is damaging to the city economy and harms both rich and poor. But the simplistic solution of controlling fares at low levels for all passengers, is inequitable because it leads to a progressive decline in the quality and quantity of all public transport services and ineffective because it will tend to generate more congesting car traffic. Rather the objective of making public transport affordable can be achieved by a more poverty focused policy.

8.4 The proposed Strategy should therefore include analyses of ways of gradually replacing overall low fares with directed subsidies as a way of making services affordable to the poor and achieve the same or better outcome for the poor without the negative consequences of low fares for all users.

8.5 Estimated Cost of Proposed 20 Year Investment Program is way beyond the financing capacity of the sector. The funds required to finance urban transport infrastructure and services of a major metropolitan area such as the GCR are substantial. As shown in Table 7, the TMP proposed a priority investment program of about for a 20 year period in capital construction costs alone (in 2002 currency terms) of about LE 60 billion - about US \$13.1 billion – (both in 2002 prices).^{35 36} Additional costs to cover infrastructure maintenance and public transport subsidies and small scale investments (such as for traffic management) would bring the total urban transport expenditures to about LE 100 billion (almost US \$ 22 billion), or LE 5 billion (more than US\$1 billion) per year. Such an amount has never been mobilized in the sector and is about ten times the average expenditure over the last decade.

**Table 7: Capital Cost of Core Transport Infrastructure 2003 -2021
(LE Billion by 2003 - 2021)**

Mode	2003-2011	2011-2021	Total	%
Road	7.0	4.4	11.4	19.0
Bus	3.8	2.7	6.5	10.8
Railway (a)	14.6	27.5	42.1	70.2

³⁴ Cities on the Move; A World Bank Urban Transport Strategy Review, World Bank, 2002, p35

³⁵ Transportation Master Plan and Feasibility Study of Greater Cairo Region in the Arab Republic of Egypt; Phase I Final Report, Volume III: Transport Master Plan, November 2002, page 11-14.

³⁶ Public-Private Partnership (PPP) Program for Cairo Urban Toll Expressway Network Development, Draft Final Report, Main Report, March 2006, p 9-10.

Total	25.4	34.6	60.0	100.0
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(a) Includes metro, light rail, & commuter rail³⁷

Note: Costs expressed in 2002, USD \$1.00 = 4.58 LE

8.6 Lack of Urban Transport Finance. Given the scale of transport problems facing the GCR, current levels of funding are inadequate. Despite good intentions, historic investment in urban transport has lagged behind investment needs. An approximate guide, a large metropolitan area such as Cairo requires about 5% of GDP for urban transport investment. This includes about 1% for urban road expansion, 1% for urban road maintenance, 1% for expansion of other modes (metro, light rapid transit and rail), 1% for maintenance of these other facilities, and a further 1% to cater for increasing demand. Any making up for previous under investment and for operating subsidies would require additional public expenditure. Actual investment appears to have been less than one quarter of the necessary level.

8.7 Major Pricing Policy Distortions. While almost all major metropolitan areas could reasonably spend more on urban transport if only the funds were available, it must be recognized that there are many other very deserving and competing uses of government funds. A reasonable way to address this problem would be to first assess where and how more revenue could be acquired from transport users to finance needed transport infrastructure and services, and second to additionally assess where and how the limited available funds allocated for transport could be more efficiently utilized. Within the GCR much needs to be done to address policy financing distortion as described below.

(a) Subsidized fuels. It is generally recognized that the price that is paid for fuel (gasoline or diesel) is about the best proxy for assigning user-charges for those who use urban roads. Based on this approach to road infrastructure funding, by far the most egregious departure from reasonable transportation financing in Egypt is the very substantial government subsidy on petroleum products. As of March 2006 the price of a regular gallon of gasoline was only the equivalent of US 65 cents. This is even lower than the US 91 cent price per gallon set by Saudi Arabia -- the largest oil producer in the world (see Annex 5 Table a). Moreover, diesel prices are also highly subsidized. As of November 2000 diesel prices were about 1/3 the average global price and typically 1/3 to 1/7 of prices in other African nations (see Annex 5 Table b). As a result, the Government has budgeted LE 40 billion (US \$ 7.1 billion) for fiscal year 2006/07 in subsidies for petroleum products.³⁸ Given that over half of registered vehicles in Egypt are located in the GCR, it is clear that a very substantial proportion of the total national fuel subsidy can be attributed to the GCR. Not only does this substantial subsidy effectively deny the government a potentially available revenue source for transport and

³⁷ Source of chart: GCR Master Plan Phase 1, Final Report, Volume 3I, page 11-14

³⁸ "Reforms to Slash Budget Deficit Level," Daily Star Egypt, May 5, 2006.

other needed investments, the very high fuel subsidy encourages uneconomic use of the private automobile at the expense of greater public transport usage further contributing to traffic congestion and environmental degradation in Cairo.

(b) Inadequate Parking Charges. The lack of charging for parking and/or substantial undercharging for parking in most intensively developed areas of the GCR can be considered a significant loss of income that could be used for improving urban transport conditions. Similarly, the lack of charging or undercharging contributes to uneconomic use of road space by automobile users. The GCR must be among relatively few and a declining number of major urban agglomerations in the world that do not levy substantial charges for parking in dense urban districts.

(c) Free Use of Road Space. At present there is no mechanism for charging motorists for use of valuable road space either in the form of toll roads or area road pricing. While the GCR has considerable company among major metropolitan areas in not tolling any roads or introducing area road charges, it should be recognized that there is a worldwide trend toward implementing these schemes both to raise revenue and to mitigate traffic congestions and, by not pursuing these options, considerable revenue is being forgone. The proposal to toll the Cairo expressway system appears to be a step in the right direction. The tolling option – if variable tolls are utilized -- also has the considerable potential benefit of managing traffic flows so that the expressway facilities do not become overloaded with traffic.

(d) Undercharging for Public Transport Services. By far the most apparent and visible transportation revenue deficiency is the substantial amount of subsidies that are directed at the providers of public sector passenger transport services. The level of operating subsidies to CTA (buses, LE 380 million), CMO (Metro, LE 309 million) and ENR (suburban railway, LE 32 million) – a total of about LE 720 million (US \$ 130 million) -- consumes a substantial proportion of the available transport budget, depleting the funds available for investment in expansion and upgrading the transport networks. While public transport fares have been kept low in recognition of the limited ability of some users to pay – they have not kept up with inflation as shown in Table # below, the result has been deteriorating service levels as the subsidies provided to the public sector operators are well below what is needed to sustain adequate services. Beyond inadequate fare levels, the inefficiencies of the public sector bus operators (CTA and GCBC) are considerable, including substantial overstaffing (see Annex 2).

Table 8: Public transport fare changes compared with inflation, 1987-2001

Mode	Ratio of Fare Increase to Inflation
CTA Bus Base Fare	0.8
Metro – Single Trip Tickets	0.5
Metro – Discounted Single Trip Tickets	0.5
Metro – Passes	0.7

Strategy for a More Sustainable Financing of the Urban Transport System in Cairo

8.8 Increasing revenues and reducing inefficiencies: Substantially more revenue is needed than has been supplied in the past for addressing the transportation problems facing the GCR. With an objective to provide cost-effective and quality urban transport services and infrastructure in a sustainable manner, funding of urban transport should be secured on a regular basis with minimum fiscal burden on Government resources. So far as possible, these additional revenues should come from transport users. This particularly applies to private cars who contribute disproportionately to traffic problems in metropolitan Cairo.

8.9 The proposed financing Strategy is to achieve higher service standards in public transport by encouraging private operators to operate and invest. This will be achieved by: allowing basic fares to increase; compensating operators for discounted travel, and; concessioning first bus routes and then tram and Bus Rapid Transit routes (and even later, possibly metro and suburban rail). The expected outcome will be lower transport cost as a result of more efficient management by privatization, a lower overall fiscal burden, more private investment in vehicles, improved quality of service, but more public investment in infrastructure and more resources to help low income passengers

(i) Higher Fuel Prices – While in principle there should be no government subsidy on fuels, especially those used for road transportation, this is unlikely to be acceptable in the short term, although it would result in an annual decrease of about LE 40 billion (US \$ 7.1 billion) in government subsidies and could provide this additional amount for investment in urban transport infrastructure and other priority sections. In addition a reasonable level of taxes on gasoline and diesel fuels ought to be applied. Many countries add a tax to the base price of gasoline to provide revenue for investment in transport infrastructure, this tax in some cases amounting to half of the total price. It is proposed that the fuel subsidy be phased out over a period to be determined by the authorities, and then that a fuel taxes be introduced. While this can appear to be a politically high risk strategy, so long as the impact on fuel prices is gradual and the consequences on people with low incomes are minimized and benefits of the investments can be seen, the policy can be feasible, as has been demonstrated in many other countries (see Box 5 – Indonesia Case).

(ii) Wider Application of On-Street Parking Charges: The potential for wider application of on-street parking charges is substantial. To encourage private investment in additional facilities without encouraging additional use of private

³⁹ Source of chart: *Transportation Master Plan and Feasibility Study of Urban Transport Projects in Greater Cairo Region in the Arab Republic of Egypt, Phase I Final Report, JICA, November 2002*

cars, the Strategy proposes that parking charges should be high enough to encourage private investment and still make car use less attractive despite the increased parking capacity. The rates for off-street parking should be market based and cover the full cost of garage construction, operation and maintenance, and give a “reasonable profit” to operators.

(iii) Introducing Road User Charges. The use of tolls on both existing and proposed expressways as proposed in the most recent Cairo Urban Toll Expressway Network Development study is included in the proposed Strategy. The Strategy also proposes consideration of cordon charging (area road pricing) for vehicle entry to the central business district of Cairo and central Giza during business hours. While considered impractical until recently, despite its long time successful implementation in Singapore, its recent successful introduction in London has generated widespread interest in its application in other large metropolitan areas.

Box 4: Increasing Fuel Prices in Indonesia

Susilo Bambang Yudhoyono -- the President of Indonesia -- took a dramatic step during October 2005 by more than doubling fuel prices and thus reducing fuel subsidies by \$8 billion equivalent annually. Like Egypt, the subsidies were straining the public purse. Also like Egypt, the rich have disproportionately benefited from the wasteful low prices. To contain the backlash against the price rises, the government set up a national program of welfare payments worth about \$32 quarterly for about 16 million poor families – about ¼ of the population. While this scheme is possibly the largest of its kind in the world, it appears affordable as it costs about ¼ as much as the money saved from cutting the fuel subsidies. The government is considering replacing this scheme with a more comprehensive long-term anti-poverty program by introducing monthly cash payments for poor families on condition that their children attend school regularly.

Source: The Economist, May 27, 2006, page 37.

(iv) Public transport fares. The current public transport tariff policy of overall low fares is financially unsustainable in the long term, does not reflect the best use of scarce public resources, and probably does not even result in serving the best interests of the poor. However, concerns about affordability of public transport services need to be balanced against the need to sustain and improve public transport services. Studies in several cities around the world have shown that many passengers are willing to pay more than prevailing low fare levels for better quantity and quality of service. The proposed Strategy includes a reconsideration of the current fares policy and an assessment of how well it is meeting its objectives, its impact on the allocation of public resources between subsidies and investment, and whether there are other policies that can better achieve its objectives without incurring the negative outcomes.

(vi) Private Sector and Competition in Provision of Public Transport Services. The emergence of the private sector in providing public transport services in recent years has indicated a feasible alternative strategy to having all public transport

provided by the public sector. The greater the role that can be given to the private sector in operation and investment in vehicles, the better the use that can be made on public resources in investment in infrastructure. Few cities have found successful ways of promoting private investment in transport infrastructure.

(vii) Mobilizing the Private Sector in Funding Urban Transport Infrastructure. Unlike the provision of public transport services, the private sector has played little or no role to date within the GCR in funding any form of urban transport infrastructure. This form of finance could be mobilized under public-private-partnership (PPP) arrangements as a way to substantially reduce the commitment of limited government funds. PPP arrangements are currently being considered for expansion of the Cairo expressway system and for upgrading the Heliopolis tram. These and other possible PPP applications should be seriously explored with a view to structuring acceptable deals for both parties.

(viii) Use of revenues from transport charges. The Strategy also includes proposals for how revenues from transport user fees and fares should be used to fund services and infrastructure.

- 8.10 The needs of public finance in urban transport include:
- subsidizing operations when fares do not cover full costs;
 - investing in transport infrastructure that is unsuitable for private investment since the revenues do not cover the maintenance and operating costs;
 - investing in facilities for traffic management;
 - testing of vehicles and drivers
 - the costs of administration of the transport system

and the principal revenue sources are:

- vehicle and driver license revenues;
- tolls on public roads;
- charges for use of public facilities, such as parking facilities and operating terminals;
- revenues from concessions for revenue generating facilities, such as toll roads;
- charges from possible area license fees and;
- fuel taxes earmarked for transport;
- allocations from government budgets

8.11 In conventional public finance, revenues from one transport mode are only used to fund expenditures in that mode, but more recently cities have started to consider urban transport as a whole and not only a collection of independent modes. This gives the opportunity to use revenues from one mode to support expenditures in another. A recent well known example is the London Area Licensing scheme, where the revenues from private vehicles are used to invest in improved public transport. Longer established is the

fuel tax in the United States that is imposed on all fuel consumed in transport, but in large part is used to fund investment in urban public transport facilities. The proposed Strategy for Cairo is to follow these examples and possibly explore alternative options if required, and to allocate transport revenues between modes independently of the mode in which they are generated. This will inevitably result in a transfer of financial resources from private to public transport.

CHAPTER IX

PROPOSED STRATEGY AND PRIORITY ACTION PROGRAM

A. Components of the Proposed Strategy

9.1 **Guiding principles of the proposed Strategy.** Building on the global experience in large metropolitan areas, the fast growing demand of urban transport travels in Greater Cairo and the results of the present review, the proposed Strategy is based on three guiding principles:

(a) The basis of providing capacity for large urban travel demand should remain with public transport system. This will ensure optimal use of scarce urban space in Cairo, provide all segments of people with adequate transport choices and reduce the pressure of investing more in road infrastructure for private cars. A focus of public expenditures, on expanding public transport supply and improving its operations will have a greater impact on making urban transport services more person-oriented and cost effective than a focus on trying to accommodate expanding demand for private car use.

(b) Expanding and making more efficient use of public transport assets and existing road space is the most effective use of public resources, and a prerequisite for ensuring that new investments in public transport achieve their full potential benefits.

(c) Giving a high priority to developing urban transportation institutions and improving urban transport finance are prerequisites for sustainable improvements of urban transport services.

9.2 The proposed Strategy derives from these three policy principles and proposes actions and investments in the following eight key areas to improve urban transport conditions and efficiency in Greater Cairo:

(i) **Organization and operation of public transport services:** Perhaps the most fundamental change that is included in the proposed Strategy is related to the ways that supply of public transport services. Recent advances by private sector operators have come about not as a result of policy change, but rather because of a lack of such change. The public sector no longer has the resources to make the recommended investments in public transport infrastructure, or operational capacity to provide public transport services efficiently or to a quality that will discourage even greater use of private cars. The first area in which action is

proposed is therefore in the organization, operation and delivery of public transport services;

(ii) *Investment in transport infrastructure.* Investment in and maintenance of transport infrastructure, both in public transport infrastructure and roads, has failed to keep pace with the increases in demand and needs to maintain ageing infrastructure. The TMP proposes to remedy this lack of investment by a massive program of new investments over the period up to 2022. These proposals were made in the context of increasing “people’s rather than vehicle’s mobility” and to facilitate a user-oriented public transport system. The TMP also proposed the development of a multi-polar urban structure, in part to reduce the demand for travel and to encourage travel in specified corridors that would be provided with adequate mass transit capacity.

Despite large investments in metro lines over the last two decades, the level of investment in public transport infrastructure has failed to keep pace with the increasing demands. As the Cairo metropolitan region continues to expand, the demands will continue to increase faster than the availability of funding. The Cairo metropolitan area has very high travel volumes in selected corridors. To satisfy demand in these and other corridors will need a combination of expensive rail (metro, trams, and light rail) and road based systems (principally large buses with bus priority facilities). So those investments that are made using public funds should be the most cost-effective that can be found, and use of those funds should be aimed at leveraging private funding. The second area of action is therefore in creating a method of project selection that delivers those that will be most cost-effective and make maximum use of private funding.

The ratio of vehicles to length of road is much higher in Cairo than in comparable cities but the space available for increasing road space is very limited and the funds available for building new roads are even more limited. Two of the most important lessons learned by urban highway engineers over recent decades are that building more roads, unless accompanied by traffic and demand management, does little to reduce road congestion, but that highly selective investments in expanding road capacity can go a long way in reducing local congestion. The next area of action is to be more selective in determining what road improvements are most cost-effective and abandoning or significantly revising those road projects that will do little more than generate increased demands for car travel. As with investments in public transport infrastructure, those to be made in road infrastructure should also be the most cost-effective in reducing traffic congestion and in attracting private capital.

(iii) *Traffic management.* Traffic management techniques to make best use of the limited supply of road space are outdated and inappropriate and insufficient to deal with the volume of traffic and make most efficient use of existing road space. The next area of action will be to implement new traffic management measures that make best use of available technology, are relevant to addressing the current level of traffic congestion. These will include more extensive and better

coordinated traffic signal systems, better pedestrian facilities and street crossings, better on-street parking management, and priority treatment for on-street bus operations.

(iv) ***Travel demand management*** is aimed at making demand for transport, and particularly the use of private cars more compatible with the road space available in congested areas and at peak times. The measures available include higher and more selective parking charges, tolling selected roads, cordon pricing to permit entry into designated high density areas and use of time based public transport fares to encourage off-peak travel. The next area of action will involve the application of these techniques, particularly in those parts of the metropolitan area that experience the most severe traffic congestion.

(v) ***Enforcement of traffic rules***. The traffic and demand management measures proposed for implementation will have negligible impact unless they are more rigorously enforced than the current traffic management measures. Such rigorous enforcement will require a different institutional structure and a change in users' perceptions of the importance of the measures. The next area of action will be to create a new system for the enforcement of traffic and demand management measures, and include selected projects to demonstrate the potential impact of improved enforcement. The new system should require less involvement of the police in traffic management, giving them more time to deal with their more core functions.

(vi) ***Affordability of public transport and user charges***. Affordability of public transport has been a successful component of urban transport policy, and will remain a key component of proposed Strategy. However, attempting to ensure affordability by implementing low fares for everyone is not a cost efficient way of achieving the objective. It diverts resources that could be used for investment to subsidies for many passengers who do not need them. The principal of affordability will be maintained in the next area of action, but implemented by policies that focus more on directed subsidies to those who need them most rather than on overall low fares.

A logical source for much of the funding for investment is much greater reliance on user charges. Many proposals for changing transport user charges will be covered under the topics of traffic and demand management. But there is another group of user charges that are designed to raise revenue rather than change demand for services. Most prominent among these are toll charges and higher prices for transport fuel.

(vii) ***Developing and sustaining urban transportation institutions***. Addressing major urban transportation issues is a complex undertaking. The current institutional structure is not designed for dealing with complex transport problems of a mega-city. The institutions are not staffed with adequately trained or

sufficient staff to devise or implement solutions to these issues. A long term and sustained program of institutional change combined with staff development has succeeded in other mega cities faced with this situation and is the basis of this area of action.

(viii) Promoting a balance between investment proposals and available funding. While it is possible to develop lists of projects that if implemented would address the lack of transport capacity and other deficiencies in the present supply of transport services, it is more difficult to determine how they would best be funded. Since funding is unlikely to be available to allow all the proposed projects to be implemented, a sound analytical method of assessing priorities needs to provide reliable evidence and advice to support the making of political decisions on which investments to approve and implement. While Egyptian universities and technical institutes can and have trained specialists in this process, few of them find their way into the government agencies where their training and experience can best be used. The final but perhaps most fundamental action in the proposed strategy will be to implement a more effective decision process for making strategic choices and assessing investment priorities in the transport sector. The strategy components, presented above, are further detailed in the following chapters.

B. Priority Action Program

9.3 The urban transport needs are very diverse and large in scale, and could be candidates for financing from a variety of sources including the government, private sector, and international organizations.

9.4 The priority investments identified in the TMP and reviewed under the proposed strategy all have a high social justification but uncertain overall funding sources since their overall cost is beyond the financial capacity of the public sector. Therefore a more detailed selection criteria system is needed to ensure that resources are allocated to the most cost effective investments with maximum impact on improving urban transport efficiency in Cairo.

9.5 **Selection Criteria:** The proposed Strategy uses an approach similar to the points scoring system used in the investment assessments in the TMP, but giving more account to relevance of projects to the overall Strategic objectives and the availability of funding. The criteria taken used are:

- Extent to which proposed investments support the proposed urban transport strategy;
- Extent to which investments deal with the main weaknesses in the present system;
- Cost-effectiveness in meeting the objectives of the proposal;
- Pilot or demonstration potential of the selected investments,
- Financial and institutional sustainability;

- Readiness for implementation, to quickly show visible improvements, and;
- Priorities indicated by the Governors of the three Governorates.

9.6 **The ranking** of strategic priorities proposals using each of these criteria results in the following priorities:

- **Compatibility with Strategic objectives:** While all the investments proposed in the TMP support the objectives of the Strategy, those that directly act to improve the quality of public transport do so to a greater extent. Proposals for investment and actions in public transport rate more highly on this criterion than those aimed exclusively at increasing road capacity. *Metro expansions* are the highest ranking as they are the only way to provide much needed additional capacity in the highest demand corridors. Investments with a dual function, such as those for *traffic management*, have an intermediate ranking on this criterion.
- **Sectoral Weaknesses:** Underlying all the sector issues are weaknesses of institutions, so proposals for *institutional restructuring and human resource development* have the highest ranking on this criterion. The next most significant weaknesses are those related to management of existing road and intersection capacity, so these also score highly on this criterion. Other significant weaknesses are the supply of bus services, so actions and investments with an objective to *making bus services more acceptable* have an intermediate ranking.
- **Cost-effectiveness:** The most cost effective measures are nearly always those with lowest costs. These include *traffic management*, especially *improvements to junction design and layout and traffic signals and signs*. Measures aimed at making road based public transport more efficient and more attractive to users and also rank highly on this criterion.
- **Pilot and Demonstration effects:** Realization of the benefits of *bus priority measures, including Bus Rapid Transit*, would benefit from the implementation of pilot and demonstration projects, so these are the highest ranking on this criterion. Public acceptance of increased *enforcement of traffic regulations and higher user charges* would also benefit from the implementation of projects that showed that are highly cost effective, so these also rank relatively highly
- **Financial and institutional sustainability:** Actions and projects that require less funding and little institutional intervention rank highest on this criterion. These include *junction improvements and expansion of road traffic signal systems, including central traffic control*. *Restructuring of bus services* involves relatively low cost, and appears to have significant public and institutional support, so this has a more moderate ranking, as its implementation requires considerably more institutional capacity than is

currently available. Also with a moderate ranking on this criterion are large infrastructure projects for which private funding has already been offered. So the *upgrading and expansion of the Heliopolis tram to SuperTram Line 1* comes into this category.

- **Readiness for implementation:** Few of the proposed investments or actions can be implemented without more analysis and preparation, so there are few that have a high ranking on this criterion. Among those requiring least additional preparation are *expansion of the traffic control systems and road projects that are engineering based such as junction layouts*.
- **Political support from Governorates:** The projects that rank most highly on the last criterion include *expansion of the metro and building of expressways*. The Governors are particularly supportive of *additional parking facilities*, particularly those that are off-street.

C. Selected Priority Actions and Investments

9.07 **Proposed priority actions and investments in the short and medium terms.** Based on the above selection approach the following specific projects have high overall rankings for implementation in the short term and medium terms (up to ten years). Other projects, mostly those requiring high levels of public investment, have high ranking in the longer term and hence will need to be deferred. The priority actions and investments resulting from the above approach and which implementation, if decided, would tremendously improve urban transport conditions and performance, are the following:

- ***Building new Institutions and Developing qualified Human Resources.*** All of the proposed institutional improvements, with the possible exception of the proposed Metropolitan Expressway Authority, have a high overall ranking for priority action. The following is a summary of the proposed institutional developments to be undertaken:
 - (a) Establishing a High Level Metropolitan Cairo Transport Steering Committee (MCTSC). This could emanate from the existing Steering Committee set up to oversee the UMTF with a redefinition of its role as the main policy decision maker in the sector including the following main responsibilities:
 - Assisting in the establishment and overseeing the development of the sector institutions (as listed below)
 - Reviewing and vetting the strategic proposals developed for improving the transportation systems of metropolitan Cairo
 - Making policy decisions, setting investment priorities and overseeing their implementation.

- (b) Creating a Metropolitan Cairo Transportation Authority (MCTA). The MCTA is conceived as the technical and executing arm of MCTSC. Therefore, it should be set up as a matter of priority to be in charge of implementing the Government urban transport strategy and improving urban transport conditions in a cost efficient way. MCTSC should be the board of the proposed MCTA. The priority actions MCTA should undertake include:
- Developing and implementing the proposed institutional reforms including a financing strategy for the sector and a reform plan for the CTA.
 - Preparing rolling 5 year transport capital investment programs for Cairo metropolitan area and financing arrangements for government decisions.
 - Preparing the restructuring strategy of the public and private sector bus route network and the regulatory framework for public-private-participation (PPP)
 - Contracting out existing and new bus and rail-based transport routes on a competitive basis
 - Updating the multi-modal transport plan, carrying out required policy studies, and building the sector information system to inform the policy making process.
- (c) Undertaking Reforms in the Cairo Transport Authority (CTA). This action should be entrusted to MCTA and will consist of developing and implementing over a reasonable period a reform plan which should include gradual concessioning of bus and tram services currently operated by CTA. Regulatory activities will be assumed by the MCTA.
- (d) Strengthening & Creating Traffic Management Departments (TMD) in each of the GC Governorates. TMD staffed with competent professionals is prerequisite for sustainable improvements of traffic congestion in GC. These structures will be in charge of the daily management of urban roads capacity and traffic demand, including:
- Preparation and implementation of traffic management schemes for high density districts, corridors, and specific traffic bottleneck locations
 - Development of capital budgets for implementing traffic management schemes
 - Procurement, operations and maintenance of traffic control devices, especially the traffic signal system
 - Preparation of parking policies and plans for implementation by parking departments

- (e) Creating Parking Departments (PD) in each GCR Governorate. There is an important untapped potential of better use of road capacity and revenue generation in GC. To realize such a potential, dedicated PD within each governorate should be created to develop, and implement a coherent parking strategy and policies. Their main responsibilities will include:
- Preparing a parking management plan (supply, pricing policy, regulations, investment plan, and PPP processes) in cooperation with the governorate traffic management departments
 - Contracting out the development and management of off-street garages to the private sector under public-private-participation (PPP) arrangements.
 - Contracting out and enforcing, in coordination with the police, on-street paid parking facilities.
- (f) Assisting the Traffic Police in Mobile Traffic Enforcement. This institutional change is dictated by the aggravated traffic congestion and the need to improve the current practices if congestion is to be alleviated. The proposed change consists of redirecting the role of the traffic police toward placing greater emphasis on mobile traffic enforcement and traffic incidence management, and gradually divesting traffic engineering responsibilities to the proposed TMDs so as to concentrate on traffic enforcement. This will include redefinition of roles and mission, and a staffing redeployment strategy and will require the support of the senior management of the traffic police.
- (g) Creating an Expressway (Toll Road) Authority. A toll road authority will be required if the decision is made to proceed with the construction and/or conversion of existing road facilities/corridors into toll roads. This authority would be responsible for regulating toll roads activities in GC, carrying out required studies and preparing transactions for PPP schemes, contracting out toll road facility designs, concessioning toll road construction and operations on a competitive basis, and managing toll road concession contracts.

The creation and/or reorientation of existing institutions will have to be carefully planned and executed to assure success. In general this may require new laws, operational by-laws, clear terms of reference detailing roles and responsibilities, new or revised staffing, training of staff, technical assistance during start up, and arrangements for adequate and sustained financing of operations. Detailed planning for these organizations would need to commence as soon as a decision is made to proceed.

- ***Upgrading and Extension of the Heliopolis Tram.*** Review of the different upgrading proposals of the tram system led to the following conclusion. The UTMP proposed a substantial and costly upgrade of the Heliopolis tram into a light rail system, including grade separations and other major infrastructure improvements. We suggest that a more realistic and cost effective upgrading be considered for the short term. Public investment in infrastructure (tracks, sub stations and signaling) will be needed. This will most likely attract private investment in rolling stocks and operations under an appropriate concession arrangement. However, given the high level of inter-action between track, signals and tram vehicles, the infrastructure investment and technology should be made simultaneously with the selection of the concessionaire. The level of required public investment and fares should be one of the decision criteria in the selection of the concessionaire. The possible merging of the Heliopolis tram with the metro system might also be considered if these systems are to remain in operation under a public sector entity.
- ***Restructuring of bus transport services.*** The main objective of this proposed action is to promote the development of a competitive, well organized, mostly formal high capacity bus-based transport supply. This restructuring will concern particularly private mini-buses and the large public bus companies. The proposed restructuring will consist of gradual “formalization” of the informal sector (through adequate regulatory and incentive framework) and rapid commercialization of the public sector bus operations (concession and contracting out of reorganized parts of the bus network). Although a high priority action, a detailed study is needed to properly design the structure of the bus network of public and private sector operators, definition of service standards, design of an appropriate and sustainable regulatory framework (including concession and PPP arrangements) to properly regulate the sector and promote competition. Once a well structured network of bus routes has been designed and competitively contracted out to public and private operators, it is suggested that an upgrading program of bus dedicated facilities (bus stops, dedicated lanes, priority at selected intersections, bus information system) be implemented to increase the productivity of the overall system, improve the quality of bus services and encourage modal shift toward increased use of the public transport system at the expense of private cars.
- ***Bus priority facilities*** to improve the public transport services on corridors with high but insufficient demand to justify a large capacity of mass transport system such as metros or trams. These facilities measures rank very highly in the priority actions and investments. They provide needed capacity in corridors other than those with the highest demand and are more cost-effective than metros in these corridors. The provision of priority bus dedicated facilities, possibly a BRT, is proposed as a more cost-effective solution to providing capacity in the corridor of the planned 4th metro line. Another highly ranked investment is the proposal for a BRT system to serve 6th October, possibly to be upgraded later to a fixed rail system with more capacity. These new projects of high capacity mass transit

systems can be structured to attract private sector through appropriate concession/leasing arrangements.

- ***Improved Traffic management Systems***, especially traffic signal upgrading and extension and junction improvements in the downtown congested traffic areas. Particular attention would be placed on facilities for pedestrians. More consultation with the governors of the Cairo and Giza metropolitan areas and/or their staffs is needed to detail the specific locations for possible traffic management interventions. The Giza Governor cited in particular the Giza, Sphinx, Remaiya squares as areas which are highly congested requiring special traffic engineering attention. Traffic engineering works along 4th metro line corridor (in Cairo and Giza Governorates) as prepared under the GC UTMP study are high priorities in this context. Along with the investments actions there is an urgent need to establish in each governorate a traffic management unit adequately staffed with, in particular, qualified engineers in traffic management and light signal programmers. The staff should receive appropriate training courses including on the job training through intensive participation in the planning and execution of the proposed traffic management measure.
- ***On-street and off-street parking programs***, especially those including an enhanced role of the private investment and operation under public-private-participation (PPP) arrangements. The priority programs would include on-street paid parking program, and well located off-street parking garages. Well located parking garages could be provided by the private sector at little or no cost to government if an adequate parking management framework is in place including a competent regulatory body (parking departments) and a transparent competitive bidding process for provision and operation of these facilities. Central Giza and the Cairo CBD (Figure 9) rate particularly highly in this category, as they do for traffic management measures;
- ***Traffic enforcement to maximize traffic management measures and to enhance traffic safety***. There is a widespread support for improved enforcement of traffic rules, but little motivation for the necessary institutional action to bring it about. An early decision is needed on the institutional arrangements under which the enhanced enforcement will be achieved. Whatever structure is adopted, the role of the traffic police should change from traffic management through static “at-point” enforcement to mobile enforcement with a view to ensuring that traffic regulations are complied with. Traffic management responsibility and related planning and engineering activities should revert to existing or to-be-created traffic management units in each of the three governorates. To accomplish these objectives, the police should receive vehicles and equipment as well as appropriate training in support of improved stricter enforcement activities.
- ***Toll Expressways*** score moderately high in the overall ranking. The high ranking derives from their institutional support as well as their potential to attract high volumes of traffic from existing congested roads. While they have public appeal

and could attract private sector investment, urban toll road experience in the rest of the world has been mixed. Not only do the land and construction costs tend to be higher than estimated, traffic levels often turn out to be lower, not least because the negative impact of high tolls is underestimated. For toll expressways to achieve their roles of attracting traffic from existing roads while generating a profit for their private investors, detailed planning and preparation is needed. In the Cairo context it also will be important to assess the potential of these facilities to accommodate high volume bus services.

- ***Urban Transport Financing and Subsidies:*** as mentioned above, subsidies of public urban transport services will remain as an important feature of the government policy in the sector. However, reduction of subsidies should not be overlooked in the short to medium term. Carefully reducing passenger transport subsidies through gradual increase of fare levels while providing targeted relief to those who cannot afford to pay is one strategy that could be deployed. Regular increases in fuel prices which subsidize private vehicle owners also deserve high priority attention. Public transport dedicated facilities (free lanes, corridors, light transit systems) can play an important role in increasing productivity and reducing transport cost of the bus and tram system. Finally, well structured private sector participation (with public contribution in investments and/or in operations) in public transport services can bring about tremendous efficiency gains and reduce the fiscal burden of the government.

D. Assistance by the World Bank and Other Donors

9.08 The World Bank, together with other international financial organization and bi-lateral lending agencies, has considerable experience in reforming urban transport systems and funding integrated urban transport projects and, if requested, would be pleased to help in implementing the above described urban transport strategy with particular focus on:

- (a) Assisting in creating and strengthening competent institutional structures to properly plan and manage urban transport services and infrastructure
- (b) Financing priority investments the GOE wishes to implement in order to rapidly relief congestion in most congested areas and improve public urban transport conditions in the GCR.

9.09 The approach of the World Bank could be as follows:

- (b) Organize working sessions with the main institutions and stakeholders, with a view to defining the implementation details and participating in an urban transport seminar to share the conclusions of those sessions with a wider audience.

- (b) Once detailed implementation arrangements have been agreed, help national and local governmental agencies in the preparation of an urban transport project that would be the basis of funding requests to the World Bank and other IFIs. Because of its positive impact on carbon emission, such a project could be proposed to the Carbon Finance facility to benefit from additional grant money.

- (c) Help in obtaining grant financing for a comprehensive institutional development study covering at least (a) the creation and launching of a Metropolitan Cairo Transport Authority, (b) strengthening / creating civilian traffic management departments in the governorates, and (c) improved financing arrangements for the urban transport sector. The study would define the functions, staffing and governance of the proposed institutions, as well as the performance targets they should achieve. It would be preferable for the study to be completed and its recommendations accepted before implementation of the project, to provide a greater certainty that the capacity to implement the Strategy and Project was in place

ANNEXES

ANNEX 1 TRAFFIC MANAGEMENT ORGANIZATIONS

I. TRAFFIC MANAGEMENT IN NEW YORK CITY

New York City is perhaps the best American model for comparison with Cairo as the city is of comparable size with a population of about 8 million (metropolitan area about 17 million), a high population density, a well developed rapid transit system. Other American cities are smaller, lower density, and have less developed public transport systems.

The Traffic Management function in New York City is housed within the City's Department of Transportation (DOT). This Department manages much of the City's transportation infrastructure including city streets, highways, sidewalks, and bridges. The Department is responsible for installing and maintaining street signs, traffic signals, and street lights, resurfacing and maintaining streets, installing and maintaining parking meters, and managing municipal parking facilities, among other activities. (The Department is not responsible for capital construction projects on the City streets and highways, traffic enforcement, or city buses, subways, and railroads). The DOT has a staff of about 5,000 persons.

Within the DOT there is a **Traffic Operations Bureau** which is responsible for planning, operating, and maintaining the traffic signal system, placing and maintaining the road signs and pavement markings, managing on-street parking and city owned off-street parking garages, and maintaining the City's street lighting system. While some traffic management planning occurs within the Traffic Operations Bureau, comprehensive traffic management schemes are planned undertaken in another part of the DOT. The staff of this Bureau exceeds 500 persons.

The Traffic Signal unit within the bureau has about 180 staff. Even with this staff size almost all traffic signal maintenance is contracted out to private sector contractors. The traffic signal system in New York is very large comprising about 11,000 signalized intersections about half of which are centrally controlled. The following units comprise the traffic signal portion of the Bureau: Traffic Signal Engineering Studies: 20 staff; Traffic Signal Design: 20 staff; Traffic Signal Timing, 10 staff; Traffic Signal Inspections (mainly to review work of private traffic signal maintenance contractors), 40 staff; Cable Plant and Cable Installation: 15 staff; Phone Line Maintenance: 22 staff; Traffic Management Center Control Room: 15 Staff; Systems Engineering and Research: 10 staff; and Administration: 20 Staff.

Traffic Signing and Road Marking is another important function of the Bureau. There are about 100 staff each for signing and marking. Most of these staff are assigned to each of the City's five boroughs (Prefectures). There are over 1 million traffic signs to maintain in the city.

The Parking Unit has about 200 staff. This unit maintains about 60,000 parking meters (mostly on-street) and city owned parking garages.

A smaller unit of about 20 staff is responsible for street lighting. These persons are mainly concerned with monitoring the condition of the street lights and the work of private contractors who maintain the lights.

The annual budget of the Bureau of Traffic Operations is about US\$110 million, mainly for maintenance and operation of the traffic signal system, and maintenance traffic signs and road markings. This does not include the annual salary budget which amounts to about US \$25 million additional.

This information was provided by Steven Galgano, Head of the Bureau of Traffic Operations. His phone number is (718) 786-3550. His e mail address is sgalgano@dot.nyc.gov.

II. TRANSPORTATION ORGANIZATION IN LONDON

1. As part of local government reorganization in London, in July 2000 the “Greater London Authority” (GLA) was created. The GLA is responsible for:

- Transport for London (TfL)
- London (Economic) Development Agency (LDA)
- Fire and Emergency Services (LFEPA)
- Police (MPA)
- London Transport Users Committee (LTUC)

2. The GLA annual budget is in excess of US\$5 billion.

3. The GLA is lead by a Mayor who is responsible for developing strategies for the development and management of the city including for transport, building/land use (spatial development), economic development, culture and some aspects of environment.

4. In the transport sector, **Transport for London (TfL)** is responsible for:

- Developing/implementing the Mayor’s transport strategy
- Managing the network of major roads termed the Transport for London Road Network (TLRN) (580 kms)⁴⁰
- Managing/operating/owning all traffic signals (about 4800 installations)
- Managing London Buses currently through London Bus Services Ltd which regulates the service (provided by over some 3730 kms of bus routes), contracts the routes to the private sector (operating some 7000+ buses); TfL provides and owns infrastructure (stops, terminals) and finances on-road bus priority (currently 1000 bus lanes totalling 240+ kms) on both its own TLRN roads and Borough (2nd tier authority) roads
- Managing London Underground (the metro system)
- Managing/operating/owning some lesser public transport services such as London River Services, Trams (28kms), Docklands Light Rail (26kms) etc

5. General Planning Functions in the Transport Sector – at the strategic level, TfL is responsible for the development and implementation of the “Mayor’s Transport Strategy”. The Strategy covers all modes for which TfL has responsibility including buses, metro, roads, walking, cycling, freight and water transport. Although not responsible for sub-urban rail, the Strategy promotes a policy of partnership with the responsible agency (the Strategic Rail Authority).

6. Operational Functions within the Transport Sector – to fulfill it’s responsibilities for implementing the Mayor’s Transport Strategy, TfL carries out:

⁴⁰ There are 13,600 kms of road in London; these roads (except the 580kms of TLRN) are the responsibility of the 2nd tier authorities (33 London Boroughs) but the Boroughs are charged with the responsibility to implement the Mayor’s strategy and thus TfL has consultative/approval role on any traffic scheme.

- Planning (often though contracting to consultants except for traffic signals for which a strong in-house capability exists),
- Design (mainly though contracting to consultants),
- Implementation (all contracted – no direct labor capability)
- Maintenance functions (all contracted – no direct labor capability) for all aspects of the traffic system (roads, bus priority, signals).

7. TfL Resources – there is no published TfL organization chart but the scale of the overall transport function (of which traffic organization forms only a part) can be judged by (i) the staffing – TfL employs directly “more than 2,800 people”⁴¹ and furthermore uses consultants extensively (and this excludes contractors for transport services operated by TfL) and (ii) the budget – TfL has a total transport budget of over US\$1.5 billion (2002/2003).

8. TfL Resources applied to Traffic Matters – traffic matters are dealt with within TfL primarily by a department termed “Street Management”. In the past some aspects such as bus priority and traffic signals were the responsibility of separate departments but recently, all traffic responsibilities have been consolidated under one department.⁴² The Street Management Department has about 165 professional staff assigned to traffic signals, 170 staff assigned for traffic studies and traffic operations plans, and about 65 staff for bus priority measures. It must be stressed that in addition to these staff levels a substantial amount of the technical work is contracted out to consultants to the Street Management Department. These staff numbers also do not reflect additional staff resources required for maintenance and replacement of street signs and road markings.

9. The areas of traffic related activities and the level of resources proposed for the next year (2004/2005) are shown below. These data are taken from TfL’s most currently published Business Plan (see www.transportforlondon.gov.uk) but should be regarded only as illustrative as they are known to be in course of up-dating. However, they serve to demonstrate the priorities and scale of traffic activities carried out by TfL.

⁴¹ TfL current Business Plan

⁴² The traffic signal control center in London, which was previously located in the police department (but controlled by civilian authorities), has now been physically transferred to TfL office space. Police are allowed to sit in the TfL traffic control center but are allowed to intercede in traffic control matters only in very special emergency situations.

Street Management Functions	Proposed 2002/2003 budget
Bus priority - bus lanes, signals schemes, traffic measures to assist buses and including consultants services for planning, design etc	US\$102 million
Congestion charging - self financing with some US\$100 million income to finance both operating costs and other transport projects	US\$0 million
Traffic regulation enforcement - (cameras, administration of violations etc)	US\$17 million
Maintenance - of roads	US\$ 150 million
Maintenance – contribution to Borough road maintenance	US\$ 90 million
Major traffic schemes - including pedestrianisation of parts central London	US\$ 16 million
Traffic signals - maintenance, management, replacement and traffic control centre	US\$ 35 million
Implementation traffic management strategy	US\$ 16 million
Walking and cycling facilities	US\$ 74 million
Road safety	US\$ 70 million
Management and technical support	US\$ 77 million
(NOTE: the above data do not include items such as new roads, new bridges, transport research, modeling, strategic surveys, strategic transport planning, major transport interchanges, mode integration initiatives, LRT etc – these are the responsibilities of other groups within the TfL organization)	

III. TRAFFIC MANAGEMENT IN PARIS

The Paris metropolitan area has a population of approximately 10 million. The Paris municipality, however, is considerably smaller with a population of approximately 2.5 million within an area of about 105 square kilometers. Within this area there are about 1500 kilometers of streets, 1,500 signalized intersections, and 230 kilometers of bus lanes. In summary, this is a very dense urban area with a corresponding heavy emphasis on traffic management of the existing street system.

The city agency responsible for traffic management within the Paris municipality is the Department of Streets and Mobility. This organization is in charge of capital construction, maintenance and management of the city road system. Within the traffic sphere, the Department is in charge of preparing plans for traffic management, all aspects of the traffic signal system (design, operations, and maintenance), road signing and marking, and parking management. It coordinates closely with RATP which is responsible for the urban passenger transport system. There is also close cooperation with the traffic police who traditionally were in overall charge of traffic management. The police still retain a very significant role in decision-making on the primary arterial road system within the City.

The Department of Streets and Mobility has a total staff of about 1,500 employees of which about 300 are concerned with traffic management. The Mobility Agency within the Department is in charge of preparing traffic policies and conducting studies and has a staff of about 30 professionals. The Mobility Operating Service within the Department is in charge of operational matters. This includes a Parking Unit (about 150 staff), a Traffic Management Unit which is in charge of the traffic signal system, road signing and marking, and other physical investments (about 50 staff), and other units in charge of support and administrative matters.

The Parking Unit is in charge of managing on street parking spaces (about 160,000) including collections, and managing the concessions with private providers of off street parking.

While the Traffic Management Unit is comparatively small, most of the traffic signal operations and maintenance and street signing and marking is contracted to the private sector. This unit operates the two traffic control centers (one mainly for the boulevard peripherique and one for arterial streets) with its own staff.

The annual Budget of the Department of Streets and Mobility is about 250 million Euros of which about 130 million is for operations and maintenance and 120 million for capital investments. Within this amount approximately 30 million Euros is allocated for traffic management operations and 21 million for traffic management investments. These operations and capital investments are largely devoted to the traffic signal system, road signing and marking, and bus priority facilities. They do not include staff costs.

This information was provided by Bernard James of the Department of Streets and Mobility. His phone number is (+33) 1-4028 -7430. His e mail address is bernard.james@Mairie-Paris.Fr

IV. TRAFFIC MANAGEMENT IN HELSINKI

Helsinki is a good example of a city that has elected to place its traffic management unit within the City Planning Department. The **Traffic Planning Division** of the Planning Department plans all traffic management measures in the city, but does not directly implement these planned improvements. Instead it hands off its plans and designs to other implementing units, principally the city's Public Works Department. The exception is the traffic signal system that is under the complete control of the Traffic Planning Division which handles all traffic signal system planning, design, operation, and maintenance.

The Traffic Planning Division has a current total staff of 72 employees. One reason for the comparatively large staff size is that Helsinki undertakes most of its work in-house with comparatively little consultant input. The total annual budget of the Traffic Planning Division is about US\$ 5 million equivalent of which about 70% covers staff costs. Most of the remaining 30% is allocated for operation and maintenance of the traffic signal system. The Division only spends about \$100,000 annually on consultants.

Besides preparing comprehensive traffic management schemes and operating and maintaining the traffic signal system, the Division plans the city's traffic signing and road marking program, plans the locations of and charges for on-street and off-street parking, and is set to take over passenger transport planning as the city moves toward concessioning passenger transport services from the private sector providers. The Department also focuses on relating traffic management proposals to existing and proposed land development in the city.

The Traffic Planning Division is organized into five units as follows: Transportation Systems Bureau (which handles city-wide traffic research, public transport network planning, and other transport systems planning): 19 persons; District Bureau (which handles smaller scale traffic planning in each of the city's districts): 19 persons; Project Bureau (which handles larger scale project plans where they occur in the city): 15 persons; Traffic Signal Bureau (which handles all phases of traffic signal design, operation, and maintenance): 12 persons; and an Administrative Unit: 6 persons. A high percentage of the staff is college educated with an emphasis on engineering, sciences, and research degrees.

The Division is recognized as an innovative and effective traffic management organization. It has been particularly successful in advancing public transport services to the city center. At present about 72% of all trips to the central business district are by public transport. This percentage in recent years has grown slightly in contrast to the

typical trend in most major cities toward private automobile trips into the center with corresponding increases in traffic congestion.

The head of the Traffic Planning Division is Olli-Pekka Poutanen, who can be reached at 358-9-169-3456. His e mail address is olli-pekka.poutanen@hel.fi.

V. ISTANBUL METROPOLITAN MUNICIPALITY TRANSPORT DEPARTMENT

I.M.M. Transportation Departments main field of activities can be stated shortly below :

1. Preparation of transportation projects and construction of main transportation infrastructures like roads, main roads, highways, junctions, carparks, transferring centers and points.
2. Repairing, restoration and controlling of those infrastructures stated above.
3. Implementation of vertical and horizontal traffic signs.
4. Implementation of ITS (Intelligent Transportation Systems) application to the city transportation network. (Those ITS applications include Traffic Controlling and Management Centers, Traffic Flow Monitoring Cams, Traffic Light System Implementations and Remote Controlling of those devices, Building Interactive Traffic Density Maps, etc.
5. Serving as center for the planning and coordinating works of Istanbul's Public Transportation System. (Both operating and future planned)
6. Serving as coordinating body between the other departments working in the transportation field.

THE DEPARTMENTS WORKING UNDER THE CONTROL OF ISTANBUL METROPOLITAN MUNICIPALITY (I.M.M.)				
UNITS		FIELD of OPERATION	NUMBER of EMPLOYEES	ANNUAL BUDGET (mio \$)
PLANNING, COORDINATING AND MAINTENANCE UNITS (DEPARTMENT OF TRANSPORTATION- Responsible to I.M.M. Secretary General)	Directorate of Transportation Planning	Working in the planning process main transportation infrastructures like roads and highways, junctions, carparks, rail based systems etc.	65	5
	Directorate of Transportation Coordination	Providing coordination about the transportation studies between the various local government and central government units and private companies. Planning and improving the public transportation choices, providing, studying and analyzing coordination between the different transportation types in the city.	90	15
	Directorate of Traffic	Planning and application of vertical and horizontal traffic signs, development of ITS-Intelligent Transportation Systems-applications, monitoring, controlling and management of traffic flows (by using ITS applications)	182	25
	Directorate of Road Maintenance	Maintenance & repairing of highways, and constructing infrastructure works like building sewer systems along the highways and roads.	724	150

ANNEX 3: RECENT WORLD BANK ACTIVITIES IN URBAN TRANSPORT

Middle East and North Africa Region and Europe and Central Asia Region

Alexandria, Egypt – Currently preparing a multi-sector urban development project that includes the reconstruction of three important roads (Al Sad Al Aly Road, Om Zeghiou Road, and a collector road in the North Merghem area bordering the Al Nubariya Canal) serving the Alexandria port and industrial areas; the project also will include improved transport access to a major commercial site that will be developed under a public-private-partnership (PPP) arrangement

Beirut, Lebanon -- Ongoing project includes traffic management, on-street parking, transport corridor improvements, and technical assistance for public transport regulation.

Bucharest Romania --Initiating studies for improving the efficiency of the Bucharest metro system, creating a metropolitan transport authority, and establishing priorities for additional capital investment in Bucharest's road and passenger transport systems.

Cairo, Egypt – Recently provided advice on the establishment of contracts for metered taco services in Cairo and for restructuring minibus services in Governorates outside the Cairo Metropolitan area.

Georgia -- Currently financing urban road rehabilitation in several Georgia cities and initiating a traffic management study for Tbilisi under a multi-sectoral urban development project.

Istanbul Turkey – Initiating urban sector work including urban transportation for Istanbul in preparation for a proposed urban development project.

Kyrgyz Republic – Recently completed a road rehabilitation project for three Kyrgyz Cities (Bishkek, Osh, and Jalalabad). The project also included technical assistance to Bishkek for the purpose of improving urban passenger services.

Moscow Russia – Currently assisting the city of Moscow in implementing traffic management measures and in strengthening urban traffic management institutions under an urban transport project. Discussions have commenced regarding a possible follow up project.

Pristina Kosovo -- Initiating a traffic management study for Pristina as part of a grant assisted transport technical assistance program for Kosovo.

Rijeka Croatia – Currently financing a traffic management study for central Rijeka (Croatia’s main port) as part of an urban redevelopment of the port area for tourist and commercial purposes.

Russia. Urban Passenger Transport – Recently completed a grant assisted study on ways and means to improve the competitive contracting for urban passenger services in Russian cities.

St. Petersburg Russia – Agreement has been reached to provide advice to the St. Petersburg government on a public private partnership (PPP) for the purpose of financing a major Western Diameter by-pass around central St. Petersburg.

Tunis Tunisia – Includes and adaptable program loan for reform of the urban transport system, including decentralization of bus companies, strengthening of public transport finances, improving bus system infrastructure depots and workshops, and studies to improve control systems and fare collection of the light rail system

Uzbekistan -- Recently completed an urban passenger transport project in 5 cities focusing on providing mid-sized buses under leasing arrangements.

In other Regions:

South and East Asia --

Mumbai, India -- Suburban railway upgrading, arterial highway development,

Hanoi, Vietnam -- Urban Transport Project includes traffic management, bus route restructuring, and Bus Rapid Transit.

Manila, Philippines -- On-going project includes improved road, bus and pedestrian access to metro stations.

China -- Urban Transport Strategy developed with Government of China and funding from GEF. Implementation includes demand and traffic management, bus route concessioning and Bus Rapid Transit Systems in selected cities

Guangzhou, Shanghai

Urumqi, Xian, China On-going projects include ring-road construction, traffic management, demand management through parking controls, new cycleways , bus service restructuring and Bus Rapid Transit

Latin America

Bogota, Colombia -- Expansion of Bus Rapid Transit and integration of traffic and demand management

Mexico City, Mexico -- Bus Paid Transit (with GEF)

Buenos Aires, Argentina -- Urban Transport Strategy in preparation

Santiago, Chile -- Expansion of Bus Rapid Transit

Africa

Lagos, Nigeria Arterial road development, suburban railway upgrading, bus service restructuring

Accra, Ghana Urban Transport Strategy under development

Dar es Salaam, Tanzania Bus Rapid Transit

ANNEX 4: ORGANIZATIONS RELATED TO URBAN TRANSPORT IN GREATER CAIRO

	Organization	Major Role in Urban Transport
Ministry of Transport		
1	The Higher Committee for Greater Cairo Transportation Planning (H.C.)	Established by a Prime Ministerial Decree in 2000, the Committee is headed by the Minister of Transport and is responsible for the overall transport planning of the Greater Cairo Region. The Committee supervises the current master plan study and is expected to be responsible for its continuous updating and modifying.
2	Transport Planning Authority (TPA)	Although this Authority is concerned mainly with national level transport planning, it has commissioned several studies about some transport issues in Greater Cairo Region such as: <ul style="list-style-type: none"> - Survey of own Account Passenger Transport by Government Agencies in GCR (1985) - The Development of the Role of the Private Sector in Urban and Inter-city Passenger Transport (1986) - Cairo Metro Interchange Coordination Study (1987) - Greater Cairo Public Transport Fare Policy Study (1992-1995) - Cairo Urban Transport Project (1980) - Greater Cairo Transportation Planning (1973)
3	Egypt National Institute of Transport (ENT)	<ul style="list-style-type: none"> - The Institute provides post graduate studies in the fields of transport planning, transport engineering and transport economics. - It provides technical training for the employee in the transport sector. - It conducted limited number of studies such as a study about the effect of underground metro as a transportation mean for the limited income group. - It maintains a library for transportation science. - The Institute is the executive agency for the Higher Committee for Greater Cairo Transportation Planning.
4	The National Authority for Tunnels (NAT)	NAT is in charge of planning and implementation of Metro and tunneling Projects such as Cairo Metro Lines 1 and 2 and Azhar Car Tunnel. Recently NAT has been the counterpart organization for the Greater Cairo Public Transport Study 2000.
5	The Cairo Metro Organization (CMO)	CMO has been part of the Egyptian National Railway, but it has been separated in 2001. CMO is in charge of operation and maintenance of the Metro network in Greater Cairo.
6	The Egyptian National Railways (ENR)	ENR is the Authority in charge of planning, implementation, operation and maintenance of the national railway network. The sections of railways within the Greater Cairo Region are part of the transportation system of the region.
7	The General Authority for Roads, Bridges and Land Transport (GARBLT)	GARBLT is the Authority in charge of planning, implementation, operation and maintenance of the intercity national road network. Because the boundaries of Greater Cairo Region extends beyond the limits of the road departments of the three Governorates, parts of the road network of Greater Cairo are under the jurisdiction of GARBLT. Figure 10.3.1 shows the parts of the national road network in the Study Area.

	Directorate	within Giza Governorate.
Qalyobeya Governorate		
17	Roads and Transport Directorate	Planning, implementation and maintenance of road projects within Qalyobeya Governorate.
Other Governmental Organizations		
18	Greater Cairo Bus Company	The Company is under the Ministry of Public Enterprise and it operates bus transportation network within the Greater Cairo Region
Non Governmental Organizations and operators		
19	Operators of Microbus Taxi Service	Individual operation of Microbus taxi service
20	Taxi Operators	Operate the taxis equipped with fare meters.
21	Operators of Special Use Buses	These buses are owned by governmental or private bodies for the exclusive transportation of its employee or tourist groups.
22	Operators of Limousine taxi	Limousine taxis are operated by travel companies for transportation between the airport and the hotels and for hotel service.

Source: JICA Study Team

ANNEX 5: FUEL PRICES

a) International Fuel Prices March 2006

<u>Nation</u>	<u>City</u>	Price in USD Regular/Gallon
Netherlands	Amsterdam	\$6.48
Norway	Oslo	\$6.27
Italy	Milan	\$5.96
Denmark	Copenhagen	\$5.93
Belgium	Brussels	\$5.91
Sweden	Stockholm	\$5.80
United Kingdom	London	\$5.79
Germany	Frankfurt	\$5.57
France	Paris	\$5.54
Portugal	Lisbon	\$5.35
Hungary	Budapest	\$4.94
Luxembourg		\$4.82
Croatia	Zagreb	\$4.81
Ireland	Dublin	\$4.78
Switzerland	Geneva	\$4.74
Spain	Madrid	\$4.55
Japan	Tokyo	\$4.24
Czech Republic	Prague	\$4.19
Romania	Bucharest	\$4.09
Andorra		\$4.08
Estonia	Tallinn	\$3.62
Bulgaria	Sofia	\$3.52
Brazil	Brasilia	\$3.12
Cuba	Havana	\$3.03
Taiwan	Taipei	\$2.84
Lebanon	Beirut	\$2.63
South Africa	Johannesburg	\$2.62
Nicaragua	Managua	\$2.61
Panama	Panama City	\$2.19
Russia	Moscow	\$2.10
Puerto Rico	San Juan	\$1.74
Saudi Arabia	Riyadh	\$0.91
Kuwait	Kuwait City	\$0.78
Egypt	Cairo	\$0.65

Nigeria	Lagos	\$0.38
Venezuela	Caracas	\$0.12

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