Higher Committee for
Greater Cairo Transportation Planning
Government of the Arab Republic of Egypt

Japan International Cooperation Agency
(JICA)

Transportation Master Plan and Feasibility Study of Urban Transport Projects in Greater Cairo Region in the Arab Republic of Egypt

PHASE I FINAL REPORT

Volume I: Executive Summary

November 2002

Pacific Consultants International (PCI)

The following foreign exchange rates are applied in this study.
USD $1.00 = 4.58 Egyptian Pound (LE)

(As of August 2002)

PREFACE

In response to a request from the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct the Study for the Transportation Master Plan and Feasibility Study of Urban Transport Projects in Greater Cairo Region in the Arab Republic of Egypt and entrusted the Study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Dr. Katsuhide Nagayama of Pacific Consultants International to the Arab Republic of Egypt between March 2001 and September 2002. In addition, JICA set up an Advisory Committee headed by Professor Noboru Harata of Tokyo University between March 2001 and October 2002, which examined the Study from Specialist and technical point of view.

The Study Team held discussions with the officials concerned of the Government of the Arab Republic of Egypt and conducted field surveys at the study area. Upon returning to Japan, the Study Team conducted further studies and prepared this report.

I hope that this report will contribute to development in the Arab Republic of Egypt, and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Arab Republic of Egypt for their close cooperation extended to the Study Team.

November 2002

Takao Kawakami
President
Japan International Cooperation Agency

November 2002

Mr. Takao Kawakami
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

Dear Sir,

We are pleased to formally submit herewith the Final Report of "Transportation Master Plan and Feasibility Study of Urban Transport Project in Greater Cairo Region in the Arab Republic of Egypt."

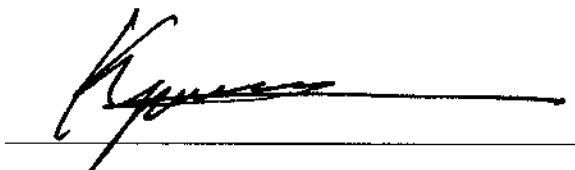
This report compiles the results of the Study which was undertaken in the Arab Republic of Egypt from March 2001 through September 2002 by the Study Team organized by Pacific Consultants International under the contract with the JICA.

This report compiles Transport Master Plan based upon identification of present condition in order to contribute to the sustainable development in Greater Cairo Region.

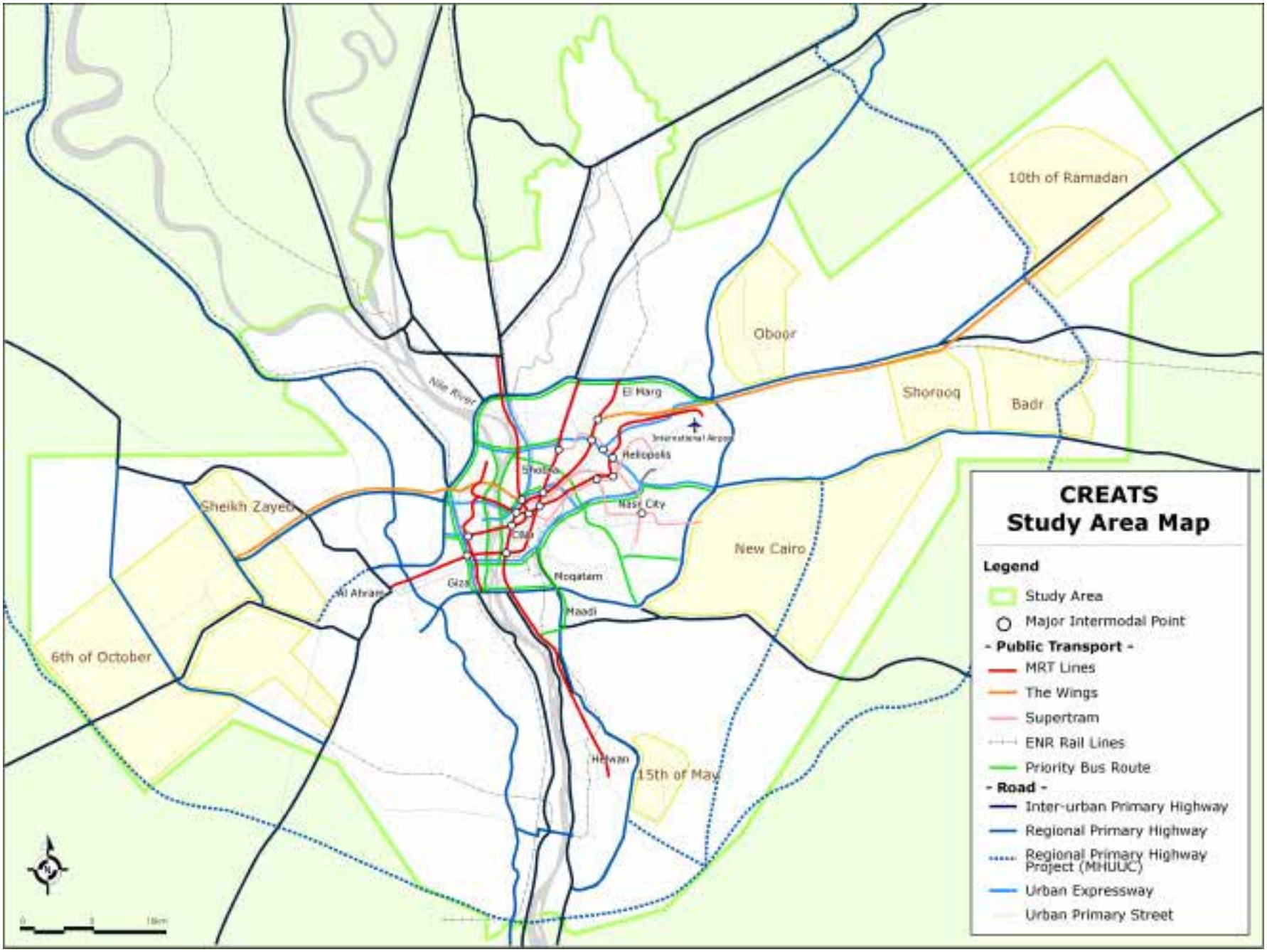
We would like to express our sincere gratitude and appreciation to all the officials of your agency and the JICA advisory Committee. We also would like to send our great appreciation to all those extended their kind assistance and cooperation to the Study Team, in particular, Ministry of Transport and Egyptian National Institute of Egypt as the counterpart agency. We beg to acknowledge our sincere gratitude to Dr. Ibrahim El Dimeery, the ex-Minister of Transport, for his devoted initiation of the Study as well as H.E. Eng. Hamdy Al Shayeb, the Minister of Transport, for his strong support to our activities.

We hope that the report will be able to contribute significantly to development in the Arab Republic of Egypt.

Very truly yours,



Dr. Katsuhide Nagayama
Team Leader,
The Study Team for the Transportation Master Plan and Feasibility Study of Urban Transport Project in Greater Cairo Region in the Arab Republic of Egypt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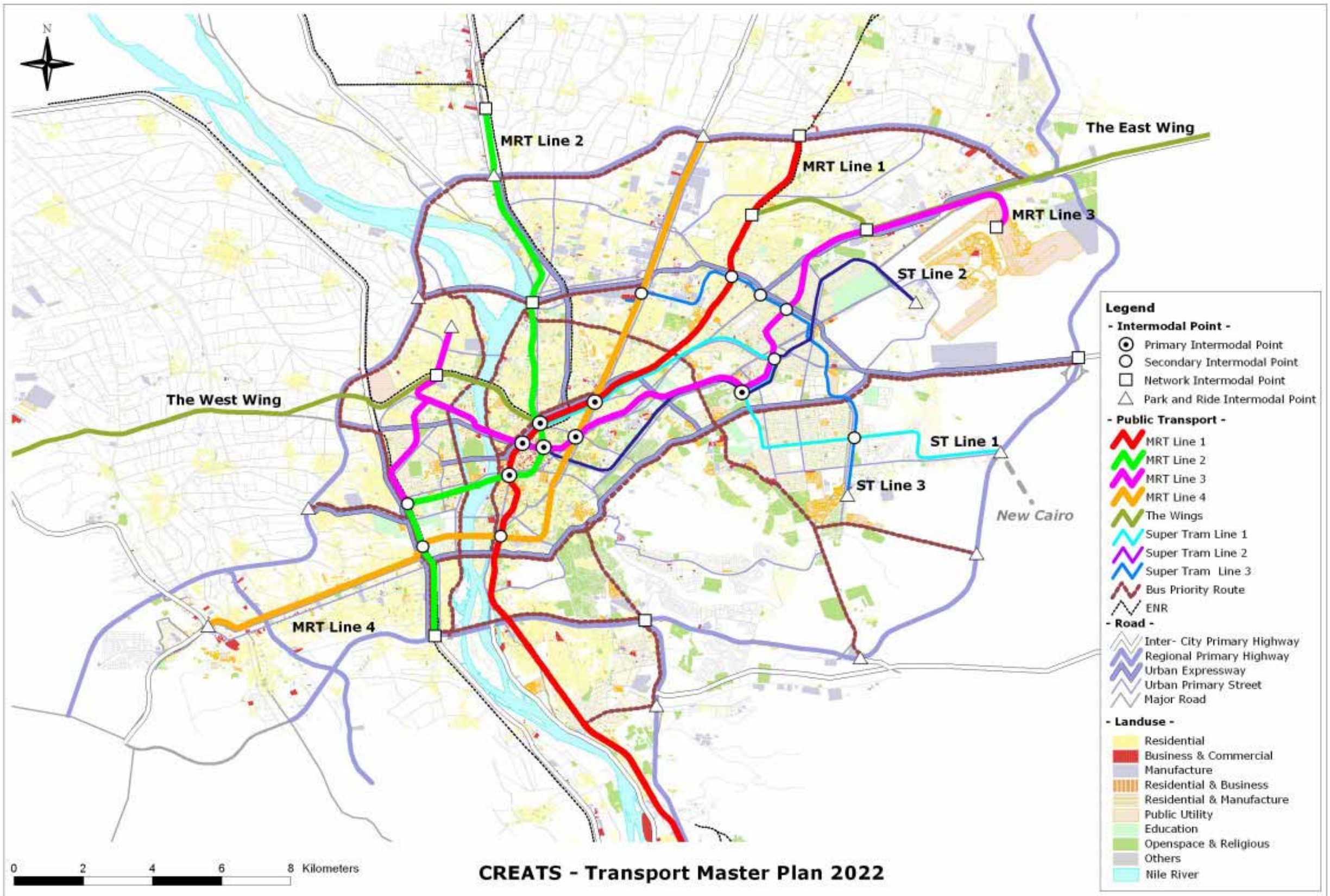
Obour
Shorouq
Badr
Nile River
El Marg
International Airport
Heliopolis
Sheikh Zayed
Nasr City
New Cairo
Giza
Maadi
6th of October
Helwan
15th of May
CREATS
Study Area Map
Legend
Study Area
Major Intermodal Point
- Public Transport -
MRT Lines
The Wings
Supertram
ENR Rail Lines
Priority Bus Route
- Road -
Inter-urban Primary Highway
Regional Primary Highway
Regional Primary Highway Project (MHUUC)
Urban Expressway
Urban Primary Street



CREATS - Transport Master Plan 2022

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	<u>Practical Demonstration</u> • Demonstration of A Traffic Safety Education Program and Campaign
Group 3	
Sound and Vibration Lab, Faculty of Engineering, Ain Shams University	<u>Surveys</u> • Environmental Survey

INTRODUCTION

BACKGROUND

Japan International Cooperation Agency (JICA) and the Higher Committee for Greater Cairo Transport Planning, are cooperating in the Transportation Master Plan and Feasibility Study of Urban Transport Projects in Greater Cairo Region in the Arab Republic of Egypt (**CREATS** – Cairo Regional Area Transportation Study), based upon the bilateral agreements finalized during November, 2000.

Pacific Consultants International (PCI), headquartered in Tokyo, Japan, is designated to be the lead consultant for the study, and organized the Study Team, head by Dr. Katsuhide Nagayama, comprising of a total of 17 experts. Technical efforts in Egypt were initiated during March 2001.

OBJECTIVES

CREATS is comprehensive in nature, that is, adopt approaches designed to mitigate urban transport problems and contribute to the sustainable development of the Greater Cairo Region. Three key objectives form the foundation of planning efforts:

- to formulate a master plan for the urban transport network in the Study Area to the year 2022;
- to conduct a feasibility study for the priority project(s) identified under the master plan (however, this object shall be undertaken as a follow-up effort to the master plan study); and
- to carry out technology transfer to the Egyptian counter personnel in the course of the study

The transport strategy embedded in the Master Plan must concurrently contribute to an efficient economic structure of the region, strengthen linkages with other parts of Egypt as well as neighboring countries, and provide a base for market-oriented transport activity. The foci of future planning efforts must gradually shift from alleviation of present deficiencies to realization of a transport system founded upon sustainable evolution and integrated, mutually supportive transport solutions.

SCOPE OF THE STUDY

The Study includes a full set of transport and traffic surveys with eleven kinds including a person trip-based home interview survey for about 57,000 sample households for identification of present conditions as well as building a reliable transport models.

The components of the Master Plan diversify beyond the traditional *"Hardware"* concepts associated with transport infrastructure provision. Additional key elements of the process consist of *"Software"* aspects, that is: technology and equipment, international standards, and multi-modal integration needs (cargo/passenger terminals, transfer points); and **"***Human-ware*" needs, or the cultivation of human resources via the designation of training and education programs as well as integration of those components, problem/issue identification and other requirements for developing expertise. The "*Sustainability*" of the future transport system shall be assured with the notion that the planning process must allow Egyptian stakeholders to participate in shaping their own future.

INFORMATION DISSEMINATION

Efforts were made until November 2002 when the final Master Plan was completed. Wide-spread information dissemination methodologies were, during that period, employed through holding a number of workshops, and seminars as well as distributing periodic "***CREATS Newsletters***" to the stakeholders. The CREATS Web-site was created for all those who are interested in the publications issued in the planning process.

STUDY MANAGEMENT AND COLLABORATION

CREATS is a result of close collaboration with well-organized Higher Committee, chaired by H. E. Eng. Hamdy Al Shayeb, Minister of Transport, Steering Committee, chaired by Prof. Dr. Ali S. Huzayyin, and Counterpart Committee chaired by Dr. Ali S. Heikal. The Study was supported by capable local resources from relevant ministries and authorities, academic institutions, the business sector as well as local consultants.

The Study Team was advised by the JICA Advisory Committee, chaired by Prof. Dr. Noboru Harata.

REPORTING STRUCTURE

The CREATS Master Plan (the outcomes from Phase I Study) is composed of four (4) separate volumes of reports:

Volume I: Executive Summary
Volume II: Urban Transport Policy and Strategy
Volume III: Transport Master Plan
Volume IV: CREATS Urban Transport Database

TABLE OF CONTENTS

A NEW CHALLENGE FOR INNOVATIVE CAIRO TRANSPORT

OVERALL ISSUES

Cairo, the premier city of Egypt and one of the cultural as well as historical beacons of the Arab World, has reached a cross-roads; her population has swelled to more than 14 million persons and will reach 20 million in 2022, thus placing growing stress on a variety of infrastructure systems. The increasingly difficult urban transport situation, characterized by a high degree of traffic congestion, constrained resources for public transport services and deteriorating air quality, lies in the forefront of such concerns. Concurrently, the political, spatial and economic roles of Greater Cairo are changing; the on-going implementation of the new communities program, anchored by the potentially massive 6th October and 10th Ramadan cities, require unique solutions which are capable of addressing both the functional integration of the region, as well as the needs of inner city development.

No single remedy can be expected to comprehensively address such issues, instead, a more holistic approach is needed. Herein lies the challenge for CREATS; innovative solutions are needed whose practicality can be viewed through the prism of existing realities. The transport strategy embedded in the Master Plan must not only address cornerstone issues such as infrastructures, policies and human resources, but concurrently contribute to an efficient economic structure of the region, strengthen linkages with other parts of Egypt and provide a base for market-oriented transport activity.

GOAL AND VISIONS

Transport is a circulatory stem of the entire social and economic activities, and a well-functioning transport system supports and ensures the expected socioeconomic development. CREATS, therefore, aims at a social goal to ultimately achieve three visions, each of which is the vital factor to improve the Egyptian people's quality of lives:

Vision 1: To Achieve Sustainable Social and Economic Growth

Cairo, the premier city of Egypt, should be a robust engine to drive the Egyptian economy towards keeping its position as the economic and cultural center in the Arab world as well as Egypt in the future.

Vision 2: To Assure Social Equality

Benefits of the development should not be concentrated on selected groups, but should be equitably prevailed for all the people. Getting one happy must not worsen another.

Vision 3: To Improve Urban Environment

Being free from any fear of environmental risks is an essential human right for all urban habitants to enjoy sustainable urban life and economic activities. The healthy city must be a pride of all the Cairo citizens.

MISSIONS OF TRANSPORT

The transport sector shall play a significant role to materialize the above three social visions. In the line with them, the Cairo urban transport should be developed to satisfy the following three missions:

- ***Economically Effective Urban Transport Systems***

Since a transport cost is part of diseconomies against the economic efficiency, the transport cost needs to be minimized to realize a sustainable social and economic growth in Greater Cairo Region (Vision 1). An economically effective urban transport system should be re-structured in such ways that travel time and costs spent for all urban activities can be

minimized and that capital investments for construction of the system and recurrent expenditures for the operation and maintenance of the system can be economically feasible.

- ***Equitable People's Mobility***

The transport sector is greatly responsible for assuring social equity (Vision 2), providing all people with equitable accessibility to places for their employments, educations, medical cares, social services and other daily activities. To this end, all people's mobility should be guaranteed by the public sector.

- ***Safe and Environment-friendly Transport System***

Any mechanized transport means generates more or less environmental pollutions as far as fossil fuels are used for the energy source; and it is likely to incur risks of accidents. Making best use of appropriate technologies and human intelligence, a safe and environment-friendly transport system should be realized to improve urban environment (Vision 3).

KEY STRATEGIES

In response to the three missions of transport, extensive and intensive efforts should be made to build a robust and sustainable system to respond to future transport demands, while solving current problems and constraints. To this end, **five (5) key strategies** are proposed towards making Cairo Transport innovative over the next two decades time-horizon (Fig. 1).

Strategy 1: Improvement of People's Mobility

Urban economies are supported by smooth and uneventful travel activities of an individual from one place to another with a purpose, which can be achieved by an optimal transport mode, not necessarily with a private vehicle. The most important is that people's mobility should be improved in such a way that every travel can be made by the optimal cost, time and mode.

Strategy 2: Optimal Infrastructure Development and Management

Economically justifiable investments should be explored in order to fulfill a gap between demands and supplies. Over-investments to provide a supply capacity eventually shoulder a negative burden on the society, and under-investments will cause economical losses in the society. The key-word must be "***optimal***" in terms of the budgetary and economic affordability of capital investments and costs for the operation and maintenance. At the same time, the optimally developed infrastructures should be properly and efficiently managed with well-organized operational systems. Hence, the management is crucial part of infrastructure development strategy.

Strategy 3: Safe and Environment-friendly Transport

Safe transport is not only a basic requisite for the human right but also a critical factor to alleviate social and economic losses. A social norm that ***pedestrians*** shall take priority in daily traffic should be fostered among all people. The environmentally risky society should be moved to realize sustainable prosperity of people.

Strategy 4: Accessible Transport for All

Public transport services should be equally provided for all the poor, handicapped, women and children, and the weak in the society. The social welfare policy needs to address effective measures even in the transport sector.

Strategy 5: Establishment of a Sustainable Institutional and Financial Mechanism

An Integrated policy implementation, a strong leadership for appropriate and timely decision-making and a sustainable mechanism to meet financial demands need to be established in order to make the Cairo Transport more functional and rational. In this regard, some institutional reforms should be taken into action.

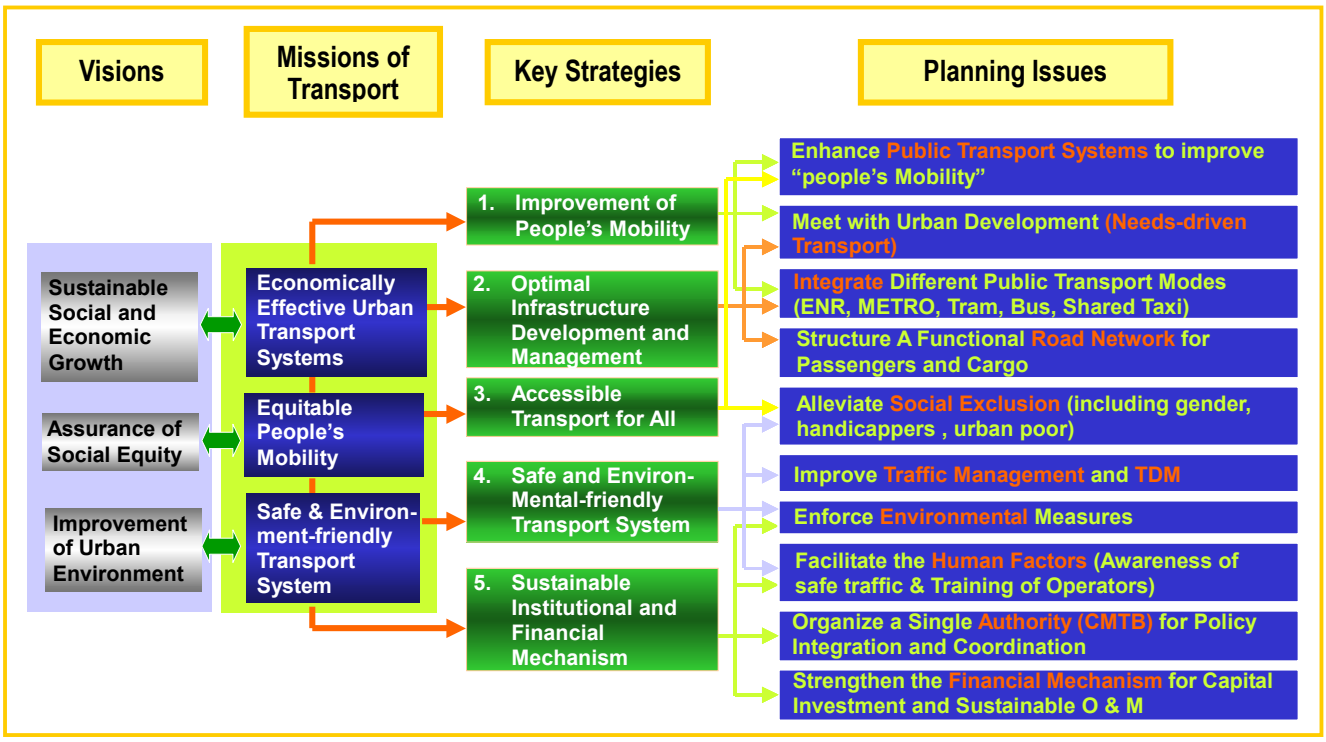


Fig. 1 Planning Structure of CREATS

PERSPECTIVES OF GREATER CAIRO IN 2022

SOCIO-ECONOMY

The Study Area, encompassing the Greater Cairo Region and new communities, has a population of 14.4 million as of 2001, which will increase to be 20.7 million in 2022 at the average growth rate of 1.7% p.a.

The GCR economy is endowed with a potential to achieve a 4.6% p.a. growth over the next twenty years. The per capita GRDP will increase at about **2.9%** p.a. during the period between 2001 and 2022, which implies that the per capita income of Cairo people will be **1.86** times as much as the present level.

MOTORIZATION

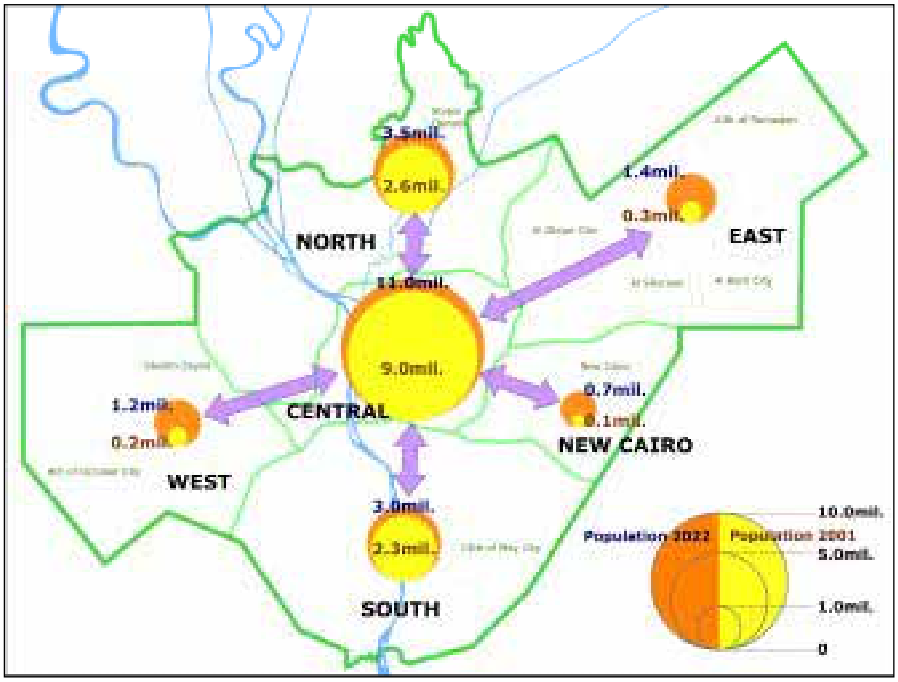
Along with the expected income increase, motorization will undoubtedly progress at a higher rate than the income growth. The total number of "cars" registered in GCR is estimated at about 1.05 million as of 2001, and the number in 2022 is projected to be about 2.5 million, which grows at **4.2%** p.a.

TRIP GENERATION

Overlooking at the ***motorized trips*** in the future, it is a critical factor to figure out the future infrastructure requirements. In twenty years the motorized mobility of people will increase with the number of trips per person rising from 1.0 to 1.2 for the medium economic growth scenario. The total number of motorized trips will increase from **14.4** to **25.1 million**, or almost double at a 2.7% p.a. growth rate over the next twenty years. The growth rate of the high income groups will be pronounced, growing at 5.5% p.a.

URBANIZATION STRUCTURE

In terms of urban land capacity, it is assessed that the new communities currently planned and being implemented can spatially and physically accommodate the increasing housing demand for the next two decades, given even a 2% population growth in the GCR.



The development of the new suburban communities depends greatly upon four key factors: 1) Economic performance in general; 2) State investment for housing and utilities; 3) Private capital for housing, facilities and employment; and 4) Transport links.

Taking into account these factors, it was projected what degree of the achievement can be predicted in the CREATS target year 2022, in other words, how many people will reside there. Under the medium economic growth scenario, a total of **2.94 million** people will live in the new communities, which represents about a **70 per cent** achievement of the planning target.

Fig. 2 Population Distribution: 2001 and 2022

OPTIMAL INTEGRATED TRANSPORT NETWORK: ANALYTICAL IMPLICATIONS

WHAT WILL HAPPEN WITHOUT INTEGRATED TRANSPORT?

A Hypothetical Scenario: "Committed Projects Only"

Given only currently committed projects in the road and public transport sectors and given nothing more than the committed efforts, the traffic situation of GCR in 2022 will be chaotic. This was envisaged by ***the CREATS model***. It is assumed that the committed public transport projects include Metro Line 3, extension of Metro Line 2 and minor enhancements of the Heliopolis metro/CTA tram, while a number of on-going road improvement projects and those included in the Five Year Plan (2002-2007) as tabulated below:

Components of "Scenario A: Committed Network"

Modes	Projects Components
Road Network	Projects under construction; Projects included in the Five Year Plan
Public Transport	
MRT	Moneeb Extension of Metro Line 2 Metro Line 3
LRT	Existing Heliopolis Metro and CTA Trams
Bus/Shared Taxi	Existing route structure

The CREATS model reveals that under such a transport condition only with the committed projects, the ***trip speed*** on the average of all modes will be as low as **11.6 km/h** in 2022, compared to the current trip speed of **19.0 km/h**. This means that the major roads will be fully congested all day, that is, the volume/capacity (V/C) rate on the daily average will reach **1.5,** which means a saturated condition, compared to **0.8** at present.

Another indicator shows that a home-based work trip (or a commuting trip) takes about **37 minutes** by car on the average at present, while it will take more than **100 minutes** by car in 2022 under the condition without any additional efforts other than the committed project. This means that given such a condition in the future, car commuters shall suffer from enormous time and economic losses.

OPTIMIZED CORE NETWORK (CREATS PLAN)

The CREATS model tested a number of different future scenarios (Scenarios A to D) with different network conditions in both roads and public transport systems in order to identify an optimal transport network to meet the future demand. A proposed CREATS network was derived from the optimization process of the integrated transport network (named Scenario D: "Optimized Core Network"), through an evaluation of the alternative scenarios. This scenario is composed of several proposals such as: 1) Metro Line 4; 2) Line 2 extension; 3) Satellite Cities Connections (the Wings); 4) Supertram Systems which are to be upgraded the existing Heliopolis Metro; and 5) Optimized bus route network with operational and intermodal coordination with Shared-taxi and the Metro System; and 6) Urban Expressway Network, as tabulated below. This scenario is called the "**CREATS Network**" which is functionally incorporated in the stem transport structure of the CREATS Master Plan proposed for the GCR in 2022.

It is noted that in the optimization process, nonphysical factors such as a budgetary constraint and Implementability of projects were taken into account over the next 20 years time horizon. However, impacts/effectiveness of some measures for **Traffic Demand Management (TDM)**, which shall undoubtedly be a significant policy tool, were examined as a sensitivity analysis under the proposed optimized network system.

Components of "Scenario D: Optimized Core Network"

Modes	Projects Components
Road Network	Committed Network + Proposed Improvements Urban Expressway Network (78 km)
Public Transport	
MRT	Committed Net, Metro Line 4, Line 2 Extension Satellite Cities Corridors (The Wings)
LRT	Supertram System+ network improvements
Bus/Shared Taxi	Optimized Route Structure Coordination with MRT / LRT Network

HOW MUCH WILL BE IMPROVED BY THE CREATS PLAN?

Comparisons in selected evaluation criteria, refering to the defined "Transport Missions", between the two scenarios of "Scenario A: Committed Network" and "Scenario D: Optimized Core Network" were made.

The traffic demand is inevitably increasing along with the socioeconomic growth to almost double in 2022 growing at 2.7% p.a. It is impossible under the financial resource constraint to provide the transport capacity sufficiently enough to meet such a rapidly increasing traffic demand. Since a "**more roads solution**" alone cannot keep up with the demand, more serious road congestion will take place everywhere without another optimal solution.

The optimality of a transport network should be guaranteed by several evaluation factors which are implied by the missions of transport. Those are:

1. Economic efficiency in terms of improvement of people's mobility, cost/benefit effectiveness, financial affordability and less congestion;
2. Equitable transport service for all; and
3. Less environmental impact.

Notable improvements in these factors by the CREATS network are described as follows and the quantitative implications are summarized in Table 1:

Economically efficient urban transport system:

As an overall evaluation in terms of "**People's Mobility**", it should be noted that with the proposed CREATS network (Scenario D), the ***trip speed*** will be recovered to be **18.0 km/h** even with **a doubled traffic demand** in 2022, compared to 19.0 km/h at present as of 2001. This means that under the CREATS Network, the overall traffic situation in 2022 will not be worsen than the current situation, otherwise the situation would be chaotically devastated in 2022, or as low as 11.6 km/h under the Committed Network (Scenario A).

With Scenario D, passengers of pubic transport will account for 20.3 million/day, compared to 18.2 million in Scenario A. The daily vehicle-km is also the greatest in Scenario D. The road congestion in terms of V/C (Volume-Capacity Ratio) will be lessened to be **1.0** in Scenario D which stands for keeping a balance between supplies (capacity) and demands (traffic volume). As for the economic evaluation, the benefit/ cost ratio of Scenario D accounts for 1.77 that means that the construction of the proposed network will be economically feasible.

Equitable people's mobility: Assuming that a 800 meter buffer zone is an easily accessible service area to any public transport mean on foot, the population accessible to major public transport modes will be 8.2 million in Scenario D, which is significantly greater than Scenario A, 3.09 million. More importantly, the number of poor households served by major public transport will be much greater than that in Scenario A, that is, 188.3 thousands in Scenario D, compared to 68.4 thousands in Scenario A. Currently, only 46.3 thousands of poor household are accessible to major public transport. Thus, the great improvement in people's mobility, for the poor in particular, can be materialized by Scenario D, that is, increasing 4 times as many as the present.

Alleviation of environmental problems: The CREATS model computed comparative levels of CO_2 emission. Since no proven data of the Egyptian vehicle emission factors is available, the Japanese data was applied for a reference. Therefore, the absolute numbers of the computed volumes are meaningless, but a comparison can be made. With Scenario D, the CO_2 emission will be less by 15% than Scenario A.

Table 1 Comparisons in Selected Criteria between Scenarios A (Committed Network) and Scenario D (Optimized Core Network-CREATS Plan)

Scenario	Present Situation 2001	Scenario A: 2022	Scenario D: 2022
Economically Efficient Urban Transport System			
Cost (LE billion)	--	18.2	59.8
Economy (B/C)	--	--	1.77
Trip Speed (km/h)	19.0 km/h	11.6 km/h	18.0 km/h
Modal Share of Public Transport (%)	70.9 %	61.7%	57.9%
No. of Pax of Public Transport (Million)	13.3	18.2	20.3
Daily Vehicle-km (10^6pcu-km)	62.8	127.3	139.7
Congestion (V/C)	0.67	1.11	1.00
Equitable People's Mobility			
Population within 800m along Major PT (Million)	2.04	3.09	8.20
Employment within 800m along Major PT (Million)	1.11	1.70	4.20
Student within 800m along Major PT (Million)	0.74	1.08	2.70
Low Income Population within 800m along Major PT (No. of HH)	46,300	68,400	188,300
Alleviation of Environmental Pollution			
CO_2 Emission (10^6 ton) 1)	12.2	15.9	13.6

Notes: 1) A comparative analysis based on the Japanase vehicle emission factors.

Overall evaluation:

The proposed CREATS network, focusing strategically on the improvement of public transport systems, is recommended as one of the optimal solutions from the economic, social and environmental standpoints. The forecasted traffic volume bands for major transport systems in 2022 with the CREATS Network (Scenario D) are as illustrated on Fig. 3.

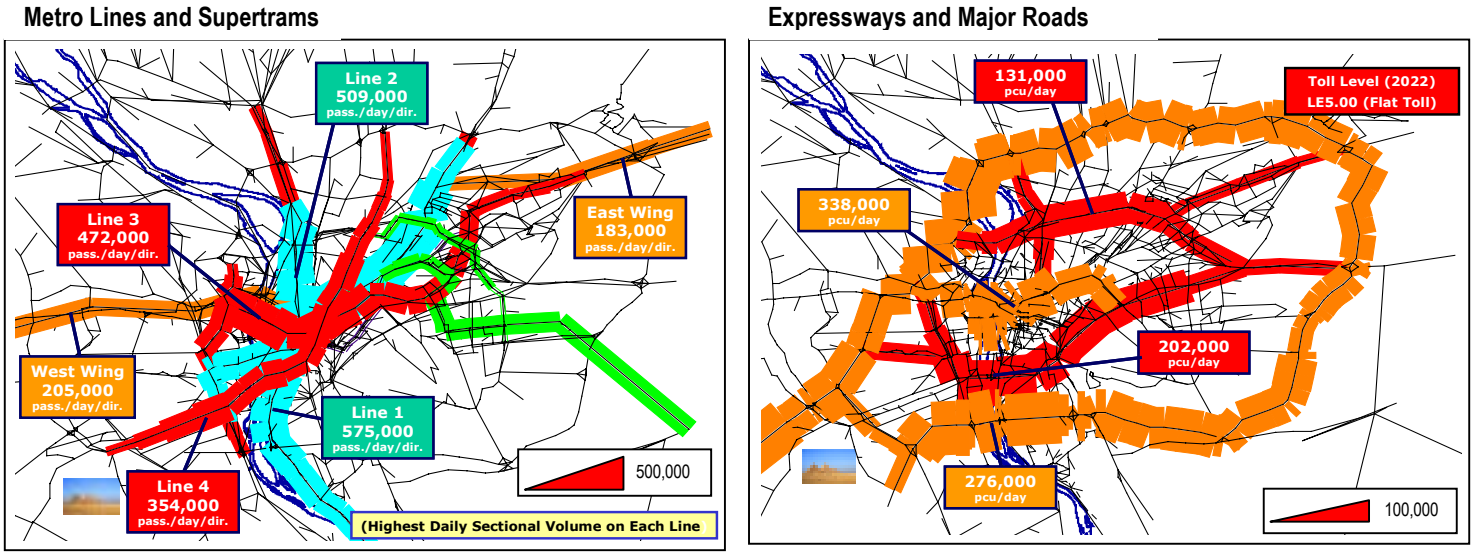


Fig. 3 Traffic Demand of Major Transport System in 2022 (CREATS Network: Scenario D)

1
Strategic Plan

IMPROVEMENT OF PEOPLE'S MOBILITY

WHAT IS AIMED TO ACHIEVE

To improve the current people's mobility to support sustainable social and economic growth in the GCR.

HOW TO ACHIEVE

- Place available resources for development of the transport sector on the improvement of ***public transport systems***, with a notion of "***people's mobility***" rather than vehicles' mobility;
- Expedite the implementation of the committed projects such as enhancement of the existing Metro Lines 1 and 2, and realization of Metro Line 3, all of which are of the highest priority, to enlarge the public transport capacity in GCR as a whole;
- Facilitate policy integration and modal integration for the structural evolution to form the "***User-oriented Public Transport System***" including:
  1) Formulating of a modal hierarchy with a complementary route structure for public transport services;
  2) Improvement of Strategic Intermodal Points/Facilities;
  3) Introduction of an Integrated Ticketing System; and
  4) Development of Park & Ride Systems.
- Introduce the Traffic Demand Management (**TDM**) policies which will be significantly effective for modal shift from cars to public transport modes, such as:
  - Introduction of a Common Ticketing System among Public Transport Modes (by this policy, **9%** increase in public transport users is expected);
  - Introduction of a policy mix with a fuel tax increase and a parking charge system in the CBD areas in Cairo and Giza (by this policy, **10%** decrease in vehicle traffic on road, and **8.4%** increase in public transport users are expected.)
- Strategically develop a number of selected sub-centers to provide employment opportunities in the service sector along major mass transit corridors to build ***a multi-polar urban structure*** in the Cairo metropolis. The potential centers are eleven, namely, 6th of October, Agooza, Omraneya, Ain Shams, Doqy, El Manyal, Maadi, Masr El Gedeeda, Zamalek, Nasr City, and New Cairo. The impacts by this urban structural change are as follows:
  - The total daily pcu-km of vehicle trips drops from 140 million to 128.8 million, which is equivalent to around 8% decrease.
  - The modal share of public transport increases from 57.9% to 59.3%.

TARGET OF THE CREATS PLAN

The "***Trip Speed***", as a numerical indicator for People's Mobility, representing the average velocity of people's travels in and around GCR by all transport modes, shall be improved, or at least not worsen. Without the CREATS network system, the trip speed would decrease to be **11.6 km/h** in 2022. Compared to the current trip speed of 19.0 km/h on the average, the proposed CREATS transport network will slightly drop down to be **18.0 km/h** in 2022, but not significantly worsen the current condition even with a doubled transport demand in 2022. Given the TDM policies, the trip speed is further improved by 9 -10%, which will yield better people's mobility than that at present. Hence, the planning target can be achieved.

2-1 Strategic Plan

OPTIMAL INFRASTRUCTURE DEVELOPMENT & MANAGEMENT
PUBLIC TRANSPORT SYSTEM

WHAT IS AIMED TO ACHIEVE

To encourage the use of an efficient, user-friendly public transport system; define the most efficient way to enhance ease of movement and foster continued economic vitality; and, ensure the sustainability and quality of public transport services through sector reforms.

HOW TO ACHIEVE

(1) Building an Integrated Network

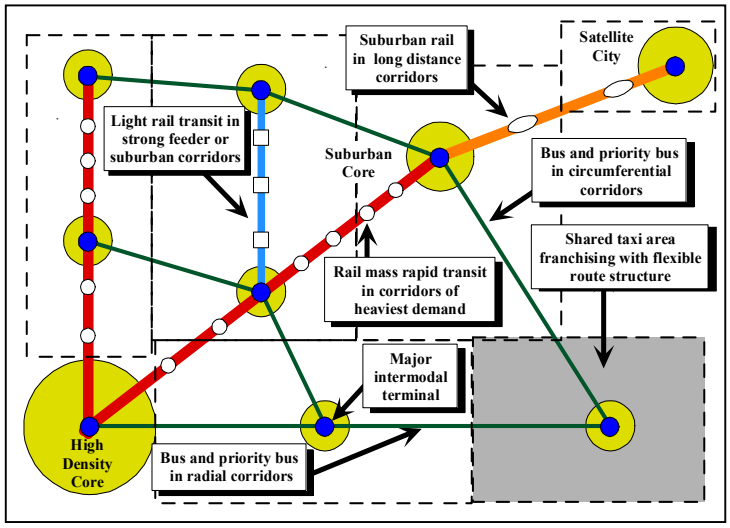


Fig. 4 A Model for Integrated Service

In order to achieve a fully integrated and efficient public transport network, planning for future public transport systems has been carried out according to a clear functional hierarchy. Each mode is allocated to specific corridors or functions as deemed appropriate for meeting forecast demand at acceptable capacity and speed.

(2) Ensuring Sustainability

A program of reform of surface public transport should be developed with two principal and inter-related goals.

- To create an efficient and effective sector capable of meeting the social and public policy needs with as little public subsidy as possible; and
- To make the sector as commercial as possible, and responsive to potential private sector participation and capital, thereby freeing scarce public resources for other purposes.

(3) Fare Policy Reform

Fare policy must be re-assessed region-wide across all modes from an operational, as opposed to political, perspective. It will be necessary to adjust fares based on realistic commercial return which implies, for some operators, an increase in base fares, and/or a revision in the approach for carrying privileged (free, reduced fare) passengers. A principal of "***user pays***" is encouraged.

(4) Public Transport for the Urban Poor

Fare levels in the formal public transport sector are not merely controlled, they are virtually frozen, ostensibly for the benefit of poorer Cairenes. The CREATS surveys, however, confirm that the shared taxi mode, which levies the highest average single-journey fare, is used most by the poorest segments of society.

One of the most effective means of providing a subsidy to low-income citizens, while maintaining the incentive for public transport operator efficiency and commercial operation, is to provide the subsidy directly to the person - not the enterprise. It is suggested that a cooperative approach via the Ministry of Social Affairs and Insurance be adopted which includes a realistic definition of urban poorness, and a strategy for a direct transport subsidy to the deserving poor.

TARGET OF THE CREATS PLAN

The ultimate goal is to provide the best public transport service at the least cost to the government. Eventually, the role of the government will be the strategic planner, coordinator

and regulator of the services, whereas the role of the private sector will be increasingly more responsible for the actual operation of services under minimal regulation and in a competitive environment.

INFRASTRUCTURE PROPOSALS

A variety of alternative solutions were examined using the CREATS model and GIS database. The final recommended infrastructure strategy integrates several modes and technologies into a cohesive plan.

MASS RAPID TRANSIT (METRO LINES): The primary elements of the Master Plan are, in addition to construction of the committed Line 2 Moneeb extension and Line 3, further extensions of Metro Lines 2 and 3, and the realization of Metro Line 4.

- Line 2 is extended from Shobra El Kheima Station to Qalyob in order to relieve the heavily loaded Alexandria Agricultural Road and to provide enhanced mobility for residents of southern Qalyobeya Governorate.
- The proposed southward extension of the Line 3 Bulak branch reaches Metro Line 2 at Behooth station.
- Metro Line 4 (some 27 km in length) is proposed to satisfy a massive person trip demand corridor encompassing El Malik Faysal Street to central Giza and Cairo, and along Port Said Street between central Cairo and the Ring Road. The MRT is mainly underground but can also partially be constructed at or above grade to reduce costs.

SUPERTRAMS: In support of the MRT network, the **realization of three Supertram lines** (a total of 53 km) is proposed. These lines function as regular LRT systems in their own rights-of-way using, whenever possible, existing Heliopolis Metro and CTA Tram properties. The recommended lines are:

- Supertram Line 1 runs from Ramses Square to Nasr City and ultimately ends in New Cairo.
- Supertram 2 connects Attaba with El Nozha, and
- Supertram 3 is a circumferential line linking Nasr City and Heliopolis with Port Said Street, as well as intermediate intermodal points with ENR, buses and metro.

TRAMS: The remaining tram lines in Heliopolis and Helwan are rationalized and rehabilitated so as to improve commercial speed and comfort. Upgrading is expected to include trackage, signaling, power supply and rolling stock.

ENR SUBURBAN RAIL: The role of ENR suburban services is expected to strengthen in future in light of growing urban densities and gradual maturity of the new communities program. The existing suburban commuter rail lines are to be upgraded (stations, rolling stock) to provide enhanced service and comfort. **Two new rail corridors** are proposed linking Cairo with the 6th of October and 10th of Ramadan cities (**West and East Wings**, respectively) in the long-term to, and beyond, year 2022. Modal selection and evolution in the Wings is contingent upon passenger demand.

THE 6TH OF OCTOBER TRUNK BUSWAY: This facility is visualized as consisting of two bus lanes (with bypass opportunities at stations) within an exclusive alignment; high-order service is to be provided via over-sized, articulated buses operating at frequent headways. This system is the first phase of the West Wing to 6th of October city, and it can carry in maximum some 34,000 persons per hour, total of both directions of travel. The busway, as a precursor of rail, would be converted to suburban rail technology only when warranted by demand.

BUS PRIORITY TREATMENTS: Busways and bus lanes are planned on important urban road arteries including parts of the Ring Road, elements of the proposed urban expressway network, Seket El Waily, El Fangary St., near Nasr City and the West and East banks of the Nile river.

PUBLIC BUS FLEET: The existing full-size public bus fleet is aged and overcrowded. It is proposed that, hand in hand with the commercialization of the CTA, a fleet modernization and

expansion program be undertaken to meet anticipated levels of future ridership, and to ensure that a modern and environmentally friendly fleet of recent vintage evolves.

FERRY SERVICES: The retention, and upgrading of, a single line, with modern vessels and docks, is incorporated as a public transport element into the Master Plan.

INFRASTRUCTURE INVESTMENT: SUMMARY

The total public transport investment for committed projects and CREATS proposals for the next 20 years will be about LE 48.4 billion at 2002 constant prices.

Table 2 Staged Public Transport Investment Program

(Million Constant 2001 LE)

Mode and Period	2002-07	2008-12	2013-17	2018-22	Total
Mass Rapid Transit	0	0	2,851	8,049	10,900
Tram and Supertram	1,041	1,923	1,469	1,474	5,907
ENR Suburban, Wings	571	1,927	1,994	5,674	10,166
Bus Fleet	1,154	1,009	1,154	1,009	4,326
Priority Bus Facilities	762	738	267	277	2,044
Nile Ferry	25	25	0	0	50
Committed Projects	2,356	6,683	5,675	300	15,014
CREATS Plan Total	5,909	12,305	13,410	16,783	48,407

2-2 Strategic Plan

OPTIMAL INFRASTRUCTURE DEVELOPMENT & MANAGEMENT
ROAD TRANSPORT

WHAT IS AIMED TO ACHIEVE

To structure a hierarchical and functional road network including the road-based public transport system with a sufficient traffic capacity to cope with the increasing demands in the long-term, and to build a sustainable financing system for the construction and management.

HOW TO ACHIEVE

(1) Establishment of A Hierarchical Road Network System

The major road network hierarchy in GCR can be functionally classified as ***Regional Primary***, ***Urban Primary***, ***Urban Secondary*** and ***Urban Expressway***. The functional road network will be formulated by properly categorizing the existing road network, and giving appropriate operation policies on road structures, traffic management and environmental measures for each classified road category.

(2) Implementation and Expansion of the Committed Projects

Such hierarchy structuring will identify the missing links and improvement necessity in the road network system, and the committed projects are all necessary to improve the road network. The program should be further expanded.

(3) Longer-term Perspectives to Cope with Increasing Demands

A longer-term perspective is necessary to be employed to structure a functional urban road system. The Urban Expressway System should be further expanded.

(4) Establishment of Sustainable Road Financing Mechanism

A sustainable financial mechanism should be introduced to stably invest capitals necessary for the road sector.

TARGET OF THE CREATS PLAN

Traffic flow at reasonable levels of service should be assured, with manageable road congestion, even under significant increases in future traffic volume. The CREATS plan succeeds in maintaining an average volume to capacity ratio of unity (or less) for the entire study area simulated road network. This is for a future year 2022 condition under which present daily road pcu-kilometers will increase from 62.8 million to 139.7 million.

INFRASTRUCTURE PROPOSAL

REGIONAL ROAD NETWORK: The Regional Ring Road planned by Ministry of Housing, Utilities and Urban Communities (MHUUC) is an important stem structure for the GCR urbanization. CREATS future traffic demand forecasts that the road capacity will be insufficient mainly in the east area, on Ismailia Desert Road and Suez Road over the next 20 years. The widening of these two links will be of higher priority for connecting 10th of Ramadan, Badr, Shrook with inner-Ring Road urban areas.

URBAN ROAD NETWORK: CREATS recommends that the most important missing links in the urban area will be in Shobra El Kheima, Matareya, Nasr City, as well as new lateral (east-west) connections in Central Cairo, and Ring Road access road improvements, among others.

GRADE SEPARATION: CREATS recommends that the at-grade intersections of Urban Primary vs. Urban Primary be given a higher priority for the next grade separation project candidates after implementing the Governorates' plans.

URBAN EXPRESSWAY PLAN: In order to cope with a substantial increase of road capacity and to strengthen a road-based public transport system, the Cairo Urban Expressway network (with 78 km long in total) is proposed with two major planning policies.

- To establish an "Inner Ring Road" to serve as a bypass for already heavily congested 6th of October and 26th of July elevated corridors; and
- To function as a "Mini Ring Road" for each urban center to reduce the congestion by preventing unnecessary through-traffic from entering into the urban centers surrounded by the Mini Ring Road.

ROAD SECTOR INVESTMENT: SUMMARY

The current five-year plan investment plan in the road sector and CREATS recommendations are summarized as shown in Table 3. The total of committed projects investment for the next five years plus CREATS proposals for the next 20 years will total about LE10.5 billion at 2002 constant prices.

Table 3 Road Sector Investment Program (LE mil)

Year	2002-07	2008-12	2013-17	2018-22	Total
MOT	111	---	---	---	111
MHUUC	471	---	---	---	471
Cairo Governorate	518	---	---	---	518
Giza Governorate	357	---	---	---	357
Qalyob. Governorate	109	---	---	---	109
Committed Projects Total	1,566	0	0	0	**1,566**
Regional Roads	190	59	78	0	327
Primary/Secondary	215	105	0	0	321
Grade Separation	140	140	140	105	525
Expressway	0	2,652	2,432	2,788	7,872
CREATS Proposal Total	545	2,956	2,651	2,893	**9,045**
Road Investment Total	2,111	2,956	2,651	2,893	**10,611**

TOLL FINANCING FOR THE EXPRESSWAY DEVELOPMENT

As a sustainable financing mechanism, proposed is the ***Toll Road Finance*** in which a toll will be charged for expressway users and the construction and maintenance costs will be recovered by the levied toll. CREATS preliminary financial analysis shows that LE5.0 toll (initiated at LE 2.0 and gradually increased) could self-finance the investment if the financial cost can be properly minimized, for example, by international finance. It is recommended, however, the toll level be initiated with lower level, such as LE2.0, at earlier years for social acceptability.

It is also recommended that the projects be implemented by a new independent organization, such as Metropolitan Expressway Authority to crystallize the finance system.

2-3 Strategic Plan

OPTIMAL INFRASTRUCTURE DEVELOPMENT & MANAGEMENT
INTERMODAL SYSTEM DEVELOPMENT

WHAT IS AIMED TO ACHIEVE

To materialize a user friendly public transport system by increasing efficiency, reducing travel time and making the system more accessible for all; and to economize transport investments as a whole.

HOW TO ACHIEVE

(1) Development of Strategic Intermodal Points

Four types of interconnecting points can be identified and should be developed. Those are:

- Primary Interconnecting Points (all public transport modes converge and a high number of passengers transiting from one mode to another);
- Secondary Interconnecting Points (major intersections between two types of public transport, e.g., Metro Line and supertram);
- Network Interconnecting Points:
- Park and Ride.

(2) Undertaking Critical Supporting Measures

The proposed measures include the *integrated fare policy and single ticketing and integrated timetables* to ensure operational efficiency.

Achieving integration of fares, tickets and timetables can only be achieved trough efficient information exchange among public transport operators (rail, tram, bus).

TARGET OF THE CREATS PLAN

The planning target is to facilitate the modal shift, increasing the number of users of public transport modes, through providing a more user-friendly intermodal system. The CREATS model analysis revealed the impacts as follows:

1) The introduction of **a common fare policy** among public bus, MRT, ENR suburban rail and LRT/tram services, is significantly beneficial in terms of ridership;
2) A distance-proportional fare system applied uniformly to all public operators can be a catalyst for increased ridership, particularly, of Supertram/Tram (about 80% increase) and ENR (36% increase); and
3) Opportunities exist for increasing (commercializing) the absolute fare levels with modest impacts upon ridership, i.e., given a unified distance-proportional fare system, an increase to 10 Piasters/km, instead of the current level of 6.6 Piasters, will decrease the demand for public transport passenger only by **5.2%,** or from 15.9 million to 15.1 million.

2-4 Strategic Plan

OPTIMAL INFRASTRUCTURE DEVELOPMENT & MANAGEMENT
TRAFFIC MANAGEMENT

WHAT IS AIMED TO ACHIEVE

To promote the safety level of the "**Pedestrian-friendly**" road transport system, while achieving a smooth traffic flow and reducing traffic accidents with appropriate engineering, technologies and enforcement.

HOW TO ACHIEVE

(1) Improvement of Traffic Signal Control System

It is often observed that current traffic congestion is caused mainly by spill-back due to near or over-saturated bottlenecks. The ***traffic response system*** must be effectively worked even if traffic shows a unstable fluctuation pattern. Installation of "area signal lights control system" should be considered in the area encompassed with Ramses, Clot Bey, Port Said, Magless El Shaab and Cornish El Neel roads where 44 intersections are located.

(2) Improvement of Parking Management System

In the Cairo CBD and Central Giza area, on-street parking ought to be more efficiently managed or strictly controlled to shift to off-street parking in areas with chronically high parking occupancy. The parking behaviors should be improved by introducing a "***Policy Zoning System for Parking Management*** (PZM)", where three levels of zonal parking management are designated, based on the zone attributes in terms of the total building floor areas of business & commercial and public uses. For each zone, the time-duration of parking prohibition and charge for on-street parking are enforced as shown in Fig. 5. During hours of on-street parking, the authority may control it with a **parking ticket system** that is an economical way without using any machine or instrument.

Zone	Enforcement	St. Share of Prohibition
A	Prohibit: 8:00-20:00	50%
	With Charge	50%
B	Prohibit. 8:00-20:00	30%
	With Charge	70%
C	Prohibit 8:00-20:00	20%
	With Charge	80%

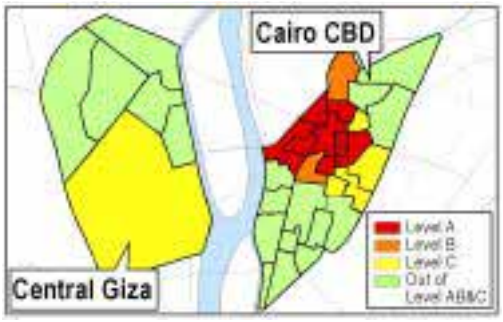


Fig. 5 Proposed Policy Zoning for Parking Management

(3) Parking Lots Development

The above on-street parking restriction policy should be compensated with development of parking lots, otherwise illegal parking could not disappear. It is estimated that under enforcement of the proposed PZM, about **7,600 lots** in Cairo CBD and **8,400 lots** in Central Giza additional parking development should be developed.

(4) Improvement of Traffic Safety and Bus Facilities

Pedestrian and environmental-friendly transport facilities should be developed to prevent pedestrians from disordered street crossing. For engineering solutions, pedestrian bridges

and pedestrian crossing zones with traffic light (i.e. scramble pedestrian crossing) are recommended to develop.

In order to uplift the service level of bus transport system in the Cairo CBD and Central Giza, a bus priority lane system is proposed to be introduced on selected trunk routes in limited peak hours.

(5) Improvement of the Vehicle Inspection System

Technical improvement of the vehicle inspection system is highly recommended. An inspection standard needs to be developed with new inspection items classified into three categories: chassis, body and lamps.

TARGET OF THE CREATS PLAN

The planning target of traffic management consists of short-term and medium-/long-term goals. Immediate actions and measures are proposed with the objectives of :

- To promote service level of public transport system;
- To achieve a smooth traffic flow;
- To reduce traffic accidents; and
- To create “Pedestrian-friendly” facilities.

More sophisticated technologies should be introduced for efficient traffic management in the medium- and long-term, as follows:

- Centralized Road Traffic Information System; and
- Bus Location Information System and Bus Priority Signal Control System.

2-5 Strategic Plan

OPTIMAL INFRASTRUCTURE DEVELOPMENT & MANAGEMENT
CARGO TRANSPORT SYSTEM

WHAT IS AIMED TO ACHIEVE

To mitigate the negative impacts by cargo traffic in the inner city, while facilitating the rationalization of cargo transport system to support the metropolitan economic activities.

HOW TO ACHIEVE

(1) Measures for Modal Shift of Cargo Transport

A first important consideration is to support a modal shift in the future, by which a share of the cargo that is presently transported by road to/from Cairo, shifts to rail and road. This will require:

- Structural and operational rehabilitation of existing rail and river terminals in the short-term future;
- In parallel with the growth of container transport, the proposed intermodal rail (Bashtil Dry Port) and river terminals (Ather El Nabi Port) in the medium term; and
- Upgrading of Bashtil Dry Port and Ather El Nabi Port to be a full intermodal terminal in the long-term.

(2) Cargo Traffic Management

The increased enforcement of the existing truck ban and an extension of the truck ban to small trucks in Nasr City, the Cairo CBD and Central Giza areas are necessary. In the medium-term, the truck ban could be extended towards Ring Road between Alexandria Agricultural Road, Ismalia Desert Road and Suez Desert Road as well as the roads towards these inter-city roads inside the Ring Road. At this Ring Road section and on the access roads inside the Ring Road, trucks should only be allowed between 11 p.m. and 6 a.m. This measure can be supported by the enforcement in these areas of a night delivery system.

(3) Cargo Traffic Demand Management Linked with Industrial Relocation Policy

To transfer industrial activity from inside the Ring Road to the new communities, an **industrial relocation premium** should be introduced in Cairo in the short-term. In the medium-term, this measure could be replaced by an industrial location license which has to be purchased at a large cost on an annual basis by the industries that still locate inside the Ring Road area.

(4) Modernization of the Freight Transport Sector

At the critical intersections between Ring Road and the inter-city roads, **three (3) truck terminals** should be developed to cope with the effects of the extended truck ban. Those are:

1) Upper Egypt Road Terminal in the south;
2) Alexandria Road Terminal in the north; and
3) Suez Road Terminal in the east.

In the medium- and long-term, these terminals could be transformed into **value-added terminals** for container transport, cargo consolidation and/or freight integration.

The successful transformation of the transport sector into a modern and efficient service sector requires:

- Short-term action: Conduct of a Freight Transport Sector Rehabilitation Study;
- Medium-term actions: Stimulating road container transport in association with introduction of the profession of integrator and consolidator for expertise of freight control systems; and
- Long-term actions: Development of an intermodal transport system with an international standard.

TARGET OF THE CREATS PLAN

Substantial infrastructure investments will not be necessary in the next 20 years, given that the proposed road infrastructures will be sufficient to accommodate truck traffic in the future. The CREATS Plan, under the above measures, will achieve the elimination of transport obstacles and facilitation of cargo transport in the GCR.

3
Strategic Plan

SAFE AND ENVIRONMENT-FRIENDLY TRANSPORT

WHAT IS AIMED TO ACHIEVE

To enhance the human resource development in the transport sector to realize the safe and comfortable transport operation, promoting the social norm of **Pedestrian Priority Society**; and to mitigate environmental pollution caused by transport activities. Fast and safe mobility is secured, and all travelers including pedestrians have the transport environment with safe

travel means. Thus, the emphasis should be placed to achieve traffic safety and better environment.

HOW TO ACHIEVE

Two domains of strategies are necessary: the human-related factors and the environmental measures as follows:

HUMAN-RELATED MEASURES

(1) Traffic Education and Information Program (TEIP)

The TEIP will have to offer a comprehensive method to improve road user's discipline and knowledge, to enhance traffic manager's expertise and efficiency, while simultaneously addressing the citizenry's passiveness towards transport and traffic problems.

The continued improvement of traffic infrastructure (**Engineering**) can improve traffic only if it is used rationally (**Education**) and efficiency controlled (**Enforcement**). The TEIP needs to be programmed so as to establish a direct link between the awareness of the traffic problems and a more rational attitude to ultimately change human behavior in traffic.

(2) Organizational System for the TEIP Implementation

An organizational system is recommended for the implementation of the TEIP with the following institutions to be newly established:

- ***Egyptian Traffic Safety Council (TRASAC)*** at the national level, responsible for the strategy, program and public financing. TRASAC shall assume to regulate a strengthened traffic law enforcement system with a *pro-active (prevention)* and *reactive (penalization)* approach to traffic offenders;
- ***The Executive Committee*** as a management entity for the implementation under TRASAC;
- ***Traffic Safety Education Center*** *(TRASEC)* responsible for practical implementation under supervision of the Executive Committee, and ***Traffic Safety Information Center*** *(TRASIC)*, attached to TRASEC, responsible for various initiatives to facilitate public awareness;
- ***Traffic Safety Organizations*** (TRASO), non-governmental organizations at the regional and local level, to catalyze drivers' traffic safety and responsible behavior with legal supports of TRASAC.

(3) Establishment of a Sustainable Financing System for Safety Program

A sustainable financing system for all activities by TRASAC and TRASEC should be assured as governmental administration. It is rational that a financial source for the safety promotion programs comes from part of fines/penalties levied from traffic violators.

(4) Enforcement of Re-education and Training for Offenders

Traffic offenders are enforced to receive penalty points, depending upon the seriousness of their violence, and their accumulated points (based on a computerized system) are registered at the police office until the year of license renewal. Those who come to gain a certain amount of penalty points should compulsorily take the one day re-education program at TRASEC.

ENVIRONMENTAL MEASURES

Environmental measures are vital elements of the strategy for safe and comfortable transport. The following measures are recommended:

- Increased use of public transport, with emphasis on rail transport;
- Increased public transport efficiency;

- Measures for better integration of intermodal systems for passengers and freight;
- Fair and efficient pricing in transport to mitigate unnecessary transport demands;
- Increased use of Compressed Natural Gas (CNG) and conversion of diesel buses/trucks, taxis to CNG;
- Improving transport regulations & operations for rational route services;
- Inspection of cars/better maintenance of cars;
- Measures for fuel savings;
- Introduction of alternative fuels/hybrid cars; and
- Environmental Awareness Campaigns.

4
Strategic Plan

ACCESSIBLE TRANSPORT FOR ALL

WHAT IS AIMED TO ACHIEVE

To provide accessible transport for all segments of residents in GCR; and to materialize an equitable public transport service system.

HOW TO ACHIEVE

(1) Enhanced Accessibility to Transport Service

From a planning approach, the definition of transport accessibility is concerned with the "ease of reaching" opportunities (schools, jobs, shops, leisure activities) or the "ease of being reached" by contacts (such as clients, customers, workers). The layout and cost of transport applies to all socio-professional classes of the population, in particular the poor. Improving accessibility aims not only at expanding the public transport network but also at contributing to the provision of public transport services to all citizens in an equitable way.

(2) Concerned Gender Issues

As a peculiar characteristic of the Cairo transport pattern, it was found by the Home Interview Survey that women made significantly less trips (**1.2 trips** per person per day) on their daily lives than men (**2.1 trips** per person per day). This can be explained partially by the traditional social custom in the Islamic society and partially by the fact that safe and comfortable public transport systems are not sufficiently provided for women. The process of "***gender auditing***" offers transport operators and other providers a framework for checking what services take adequate account of the women's transport requirements for their social and economic activities. Its aim is to improve the quality of transport service, which, in turn, will assist operators by increasing patronage.

(3) Transport Facilities For Disabled People

Local authorities and transport operators should ensure that the transport needs of disabled people are factored into their plans and that the full benefits of improved public transport are accessible to all.

(4) Special Measures for the Poor

Affordability of transport is an essential aspect of accessibility when viewed by the poor. The following measures are required for the poor:

- To provide a subsidy directly to poor, while maintaining the incentive for public transport operator efficiency and commercial operation.
- To pursue a cooperative approach via the Ministry of Social Affairs and Insurance for a direct transport subsidy to the deserving poor; and
- To serve isolated areas with paratransit and/or microbuses to ensure the poor have access to the integrated transport network.

TARGET OF THE CREATS PLAN

The CREATS Master Plan targets to provide any public transport service for all so that every one can make easy access to places for employment, education and medical cares and social services. A numerical target is to maximize the number of people, jobs, students and low-income households that can be served within a distance of ***800 meters*** from/to major public transport modes, such as Metro, Suburban rail and Supertram. The distance of 800 meters is defined as a pedestrian accessible limit (or a 10 minutes walk distance). By this definition, the CREATS Master Plan can cover about 7.84 million people (38% of the total), 4.1 million employments (59%), and 2.6 million students (44%) with the major public transport modes.

It is also targeted that as many poor households as possible are served by major public transport. With the CREATS Master Plan, about 188 thousands low income households (less than 300 LE/household/month), or about 40% of the total low income households, will be accessible to the major public transport means in 2022, compared to the current situation that only 46 thousands low income households, or about 5% of the total, are accessible to them.

5
Strategic Plan

SUSTAINABLE INSTITUTIONAL AND FINANCIAL MECHANISMS

WHAT IS AIMED TO ACHIEVE

To integrate policies both within the transport sector and between the transport sector and other aspects of urban development to rationalize the public investment and make the transport policy effective; and to strengthen a sustainability of financing mechanism.

HOW TO ACHIEVE

(1) Institutional Reform for Policy Integration

Regarding the transport policy planning and integration for the Greater Cairo Region, the following measures are recommended:

➢ Establishment of the Ministerial Committee for Greater Cairo Transport

Ministerial Committee for Greater Cairo Transport should be the driving force as an inter-governmental policy-building and decision-making body for the implementation of the Master Plan with integration and coordination between policies of the related Ministries (Ministry of Transport, Ministry of Housing, Utilities and Urban Communities, Ministry of Interior, Ministry of Environment) and Governorates (Cairo, Giza, Qalyobeya and Sharqia). The existing ***Higher Committee for Greater Cairo Transport Planning*** under Ministry of Transport shall continuously function as a core under the Ministerial Committee.

➢ Establishment of Cairo Metropolitan Transport Bureau (CMTB)

Cairo Metropolitan Transport Bureau (CMTB) should be under the Prime Minister Office to facilitate inter-ministerial coordination by a Presidential Decree to give it the needed authority. CMTB assumes three fundamental functions as follows:

- Transport-related policy planning;
- Preparation of necessary regularization, standardization and legalization; and
- Initiation of integrated transport policy and/or program and its monitoring.

➢ Local Institutions for Transport Engineering Management

On the local level, it is recommended to establish Transport Engineering Management Bureaus at each Governorate, same as Cairo Traffic Engineering Bureau (CTEB).

➢ Establishment of Urban Transport Planning Unit in ENIT

ENIT should be further strengthened in its research capability as well as planning management capability including maintenance of the ***CREATS transport database*** which is a great asset for expansion of transport research. *The* ***Steering Committee for CREATS*** shall be continuously maintained as a technical advisory body to ENIT's research activities.

➢ Jurisdictional Definition of Greater Cairo Region

An administratively agreed definition for GCR is needed in order to establish a unified database and integrated policies to be shared by all relevant authorities. The CREATS area, encompassing new communities, may be re-defined as the GCR.

(2) Sustainable Financial Mechanism

The implementation of the CREATS Master Plan needs to be constantly and stably financed by the government sector. In order to strengthen the budgetary base for the transport sector, the following financial measures are recommended:

➢ Rationalization of the Current Subsidy Policy for Transport

Based on the experience of the average financial performance of European public transport operators (500 member operators of International Union of Public Transport – UITP), a recommendable and practical guideline for the subsidy is that operational revenues should cover the recurrent operational costs and **70%** of the total costs including capital costs and depreciation, then the government subsidy is appropriated to fulfil the shortfall. To this end, deregulation for the public transport operators should be pursued.

➢ Restructuring of the Public Transport Fare System

A financially sustainable, commercialized and integrated service concept should be emphasized rather than artificially suppressing fare levels below what are perceived as people's level of affordability. The fare structure should be flexibly and periodically adjusted based on economic indicators and the market mechanisms.

➢ Introduction of "User Pay System"

It is expected that the Egyptian society would accept the ***user pay system***, or ***beneficiaries-pay-principle,*** under which beneficiaries pay fair charges out of pocket, instead of asking for free transport service from the government, using tax money. This policy can be applied for 1) The toll system for Urban Expressway System; and 2) On-street parking charge system.

➢ Introduction of an Earmarked Taxation for Transport Improvement

The earmarked funding system should be introduced to strengthen the governmental funding base. The following policies are recommended:

- Levied tax on fuel is earmarked for improvement of transport facilities. A computation envisages that should the current fuel price increase at 2% p.a. over the next twenty years, a total of about LE 41 billion could be available for the transport sector in GCR; and
- Funding for the traffic safety program and facilities from some part of fines imposed on traffic offenders.

➢ Public-Private Partnership

Several schemes can be conceivable for the private sector to participate in development and operation of transport facilities and services. However, all are very sophisticated and difficult for successful achievement. A legal framework for the public-private partnership should be developed prior to launching a privatization project particularly for the transport sector.

(3) Restructuring and Modernization of Public Operators

For providing better transport services in a more feasible and functional manner, the public transport operators should be restructured:

➢ Commercialization and Rationalization of Cairo Transport Authority (CTA)

Under the commercialization process, CTA shall be restructured in terms of its organizational structure, business areas to be enhanced, rationalization of routing, financial and personnel management, engineering of maintenance and human resources development.

➢ Area Franchising System for Shared-Taxi Operators

An “area franchising system” is proposed for shared-taxi operation to structure a more functionally integrated road-based public transport network with formal bus services, rather than being competitive against bus and Metro services. Assuming that a franchised area where a business license is given to a shared-taxi operator shall be about 100~150 Km^2, the entire GCR is divided into 9 franchised areas.

➢ New Organization for ENR Suburban Rail

A new entity exclusively responsible for GCR suburban rail services is recommended to establish as a part of ENR or an independent cell of ENR with the private sector’s financial participation. Through such organizational arrangement, the new entity will be able to run the rail business more flexibly and more efficiently.

➢ Establishment of the Toll Expressway Development Public Corporation

The CREATS proposed expressway (78 km) can be financially self-sustainable, given a toll system with a proper pricing policy. It is recommended to establish a new organization to be responsible for construction, operation and maintenance of the system. The organization will be a public corporation under a public-private partnership scheme.

RECOMMENDED PROJECTS AND PROGRAMS

PHASING CONCEPT

CREATS proposes a phasing concept that shows what activities, grouped into three dimensions, namely ***hardware*** (infrastructure); ***software*** (institutional arrangement); and ***humanware*** (education and training), should be carried out in the three phases over the next two decades, with both sectorial project linkages and inter-sectorial linkages.

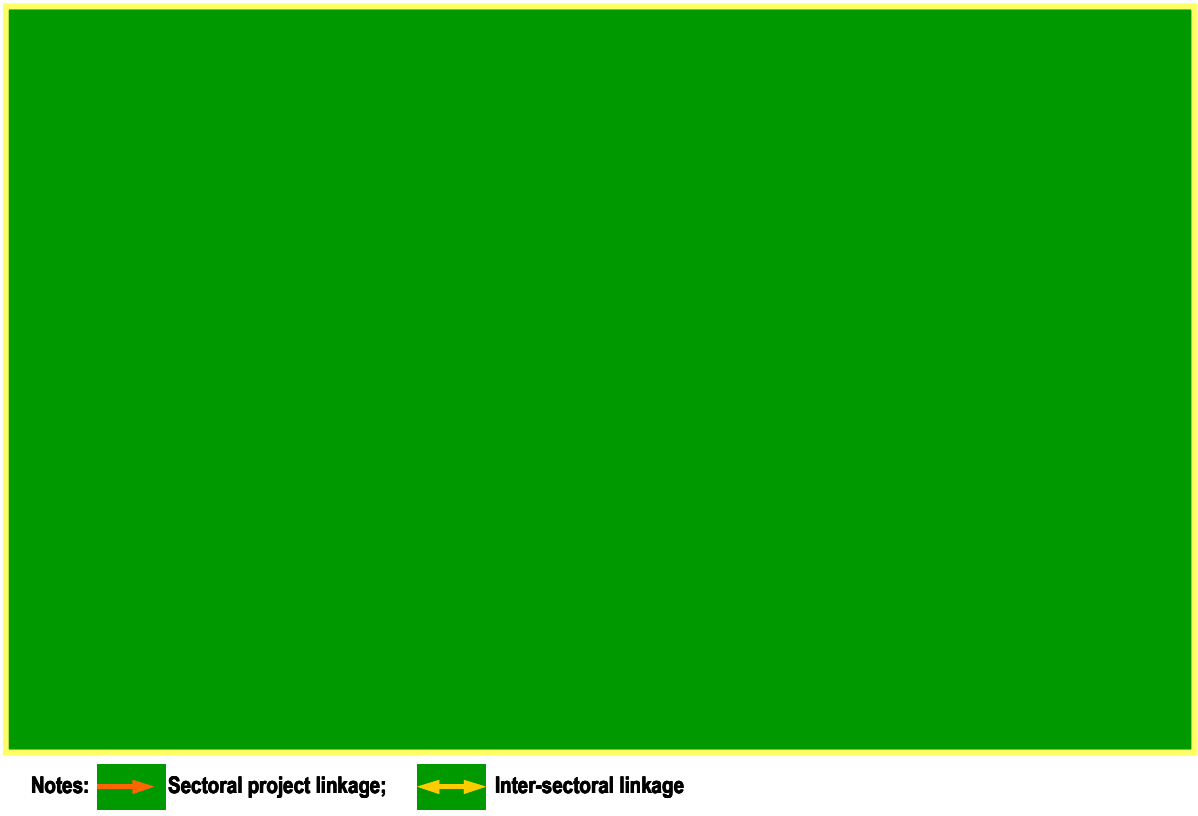


Fig. 6 Proposed Phasing Concept for Integrated Transport Development System

PROPOSED PROJECTS AND PROGRAMS

Under the above conceptual framework, CREATS proposes a total of 56 projects and programs, as tabulated in Table 4, to realize the five key strategies embedded in the Master Plan for achieving an integrated transport system. The necessary investments or initiatives for the implementation are conceptually allocated into three phases. Priority activities to be rendered in the short-tem are given to those that will initiate the proposed strategies to formulate an integrated transport system as follows:

1) Strengthening of an integrated public transport system featuring MRT, LRT, suburban rail and bus services to improve people's mobility;
2) Economic rationality of the investment;
3) Rehabilitation and revitalization of existing infrastructures;
4) Low-cost solutions with ease of implementation and quick impacts;
5) Essential initiatives to catalyze improvement of efficient, safe and comfortable transport; and
6) Institutional programs required as a prerequisite the implementation of the CREATS Master Plan.

Table 4 CREATS Proposed Projects/ Programs by Strategy

Strategy 1: Improvement of People's Mobility

Proposed Measure and Project/Program	Short	Mid.	Long
Integrated Public Transport			
Committed Projects			
Hierarchy of Modes			
Improvement of Strategic Intermodal Points/Facilities			
Development of "Park and Ride System"			
Complementary Routes Structure for PT			
Introduction of an Integrated Ticketing System			
Traffic Demand Management			
Introduction of measures and Policies			
Truck Traffic Control (Generalized Truck Ban)			

Strategy 2: Optimal Infrastructure Development

Rail-based Public Transport			
Committed Projects			
New Metro Line 4 (Pyramid Line) Development			
Heliopolis Metro and Tram Upgrading			
Super Tram Introduction			
ENR Suburban Line Improvement			
East-West Wing Lines to New Communities			
Intermodal Facilities Development			
Road-based Public Transport			
Improvement of Public Bus Facilities			
Public Bus Fleet Improvement			
Priority Bus Facility Development			
Roads and Highways			
Committed Projects			
Primary/ Secondary Roads Development			
Grade Separation Works			
Expressway Network			
Cargo Transport			
Truck Terminal Development (3 Locations)			
Expansion of Existing Rail and River Terminals			
Sector Restructuring			

Strategy 3: Accessible Transport for All

All Citizens			
Public Transport Route Structure			
Safe and Comfortable Amenities			
The Poor			
Social Welfare Policy for Transport			
Targeted Subsidy			
Area-Specific par Transit Operation			
Gender-Based			
Provision of Clean and Safe Bus Service			
Establishment of a "Gender Auditing System"			
Handicapped			
Improvement of Barrier-Free Facilities at Stations			

Strategy 4: Safe and Comfortable Transport

Proposed Measure and Project/Program	Short	Mid.	Long
Traffic Management			
Improvement of Intersections/ Signal System			
Policy Zoning System for Parking Management			
Development of Parking Lots			
Improvement of Bus Safety Facilities			
Public Transport Information Dissemination			
Introduction of Traffic Information System			
Human Resource Management			
Establishment of Egyptian Traffic Safety Council			
Traffic Safety Education & Information Program			
Coordinated Enforcement for Drivers' Licenses			
Environmental Measures			
Enhanced Environmental Monitoring System			
Increased Use of CNG and Unleaded Gasoline			
Enforced Transport Regulations & Operations			
Enhanced Vehicle Inspection System			
Introduction of Alternative Fuels/ Hybrid Cars			
Environmental Awareness Campaigns			

Strategy 5: Institutional and Financial Mechanism

Institutional Arrangement			
Establishment of CMTB			
Sustainable Financial Mechanism			
Rationalization of Subsidy Policy and Revision of Public Transport Fare Structure			
Introduction of "User Pay System"			
Stepwise Privatization of Bus Public Transport			
Introduction of "Earmarked Taxation"			
Justifiable Investment Human Resource			
Legalization of Public Private Partnership Scheme for Transport Investment			
Facilitation of Public Awareness of "Safety and Environment"			
Improvement/ Restructuring of Operators			
Capacity Building of Operators for "Good Practice"			
Restructuring of CTA			
"Area Franchising System" for Shared Taxi			
Establishment of "Suburban Rail Service Corporation" and "Expressway Development Corporation"			

Notes:

1) Measures in "blue letters" represent "institutional, organizational and/or human-based program"; while those in black, physical and/or infrastructure projects.
2) The color gradation in phasing blocks stands for a relative magnitude of investment/ activity of the corresponding project/ program, that is, the darker, the more.

PRIORITY PROJECTS/ PROGRAMS

Table 5 Prioritized Top Twenty Listing
CREATS Infrastructure Projects

Project and Program	Rank	Points	Begin
MRT Line 1 Improvements	1	18	S
MRT Line 4	2	20	L
MRT Line 3	3	21	S
Public Bus Fleet Modernization	4	48	S/M
MRT Line 2 Extensions	5	51	S
Supertram Line 1	6	57	S
Supertram Line 3	7	74	M/L
6th of October Trunk Busway	8	75	S
Central Cairo GS Plan Package	9	82	S
Rail Wing East (Phase 1)	10	86	S/M
Tram / Heliopolis Metro Rehabilitation	11	93	S/M
Rail Wing East (Phase 2)	12	93	L
River and Rail Container Terminals	13	98	M
Shobra El Kheima GS Plan Package	14	100	S
Supertram Line 2	15	113	M/L
Rail Wing West (Phase 2)	16	114	L
North Cairo GS Plan Package	17	122	M/L
Giza GS Plan Package	18	133	S/M
Heliopolis/Nasr City GS Plan Package	19	148	M/L
Ring Road (on Maryooteya Road)	20	151	S

Note: ranking contains top twenty projects based on accumulated points achieved via testing and sensitivity analyses. "Begin" refers to initiation of project during short (to year 2007), medium (years 2008 to 2012) or long (after year 2012) terms. Refer Volume III for more precise sectorial scheduling.
Source: JICA Study Team

Table 6 Prioritized Top Ten Listing
CREATS Reform and Humanware Programs

Project and Program	Rank	Points	Begin
Improvement/restructuring of Operators	1	39	S
Public Bus Fleet Modernization	2	48	S/M
Institutional Strengthening	3	52	S
Accessible Public Transport For All	4	78	S
Cargo Transport Sector Restructuring	5	90	M
Human Resources Development	6	97	S
Investment Decision Procedures	7	98	S
Targeted Support for the Poor	8	113	S
Traffic Demand Management	9	128	M/L
Traffic Management and Control	10	131	S/M

Note: ranking contains top ten programs based on accumulated points achieved via testing and sensitivity analyses. "Begin" refers to initiation of project during short (to year 2007), medium (years 2008 to 2012) or long (after year 2012) terms. Refer Volume III for more precise sectorial scheduling.
Source: JICA Study Team

METHODOLOGY

The prioritization of a total of 56 recommended projects and programs was accomplished in two steps: In the initial step, all projects and programs are ranked using a ***Goal Achievement Matrix*** (GAM), employing twenty criteria reflecting to the five key-strategies addressed by the CREATS Plan. This provides a theoretical ranking list among all projects/programs. Having the result, the second analysis determines an implementation logic in consideration of the interdependency of projects, and their priority levels and typology. Table 5 shows the high priority infrastructure projects (Top 20) and Table 6 the institutional and humanware programs (Top 10), based on the GAM methodology.

PRIORITY PROJECTS AND PROGRAMS

Towards forming the integrated urban transport system, infrastructure projects should be implemented in association with institutional and human-related programs. Yet, viewing the infrastructure projects, MRT-related projects such as the improvement of MRT Line 1, the extension of Line 2 and the new construction of Line 3, are ranked at the highest places. These have been all committed, therefore, should be executed as scheduled. Metro Line 4, proposed by CREATS, is also at the highest rank, however, it is recommended that this project is commenced soon after the committed MRT projects are accomplished or get started along the right lines.

Other than the MRT projects, three projects are evaluated to be of the highest priority, namely,

- Supertram projects;
- Public bus fleet expansion/modernization project (to proceed hand in hand with commercialization of the CTA); and
- The 6th of October trunk busway project.

These are vital to structure an integrated mass-transit system, therefore, should be initiated at the early phase.

Regarding the institutional and human-based programs, all the programs ranked at the top 10 are equally crucial. Among them, the highest priority is given to the programs for:

- Improvement and restructuring public transport operators;
- Institutional component for "public fleet expansion and modernization", and
- Institutional strengthening for integrated policy.

Although all the programs listed in the top 10 are related to each other, these may be pursued individually. However, in order to make them successful, definite political decision-making for a comprehensive sector reform is needed. This should start with establishment of an organizational structure for integrated policy formulation as soon as practical.

FOR THE IMPLEMENTATION

ECONOMIC EVALUATION OF THE CREATS MASTER PLAN

The proposed CREATS Master Plan requires a total of **LE 59.8 billion** (at 2002 prices) over the next twenty years up to the year 2022, out of which **LE 18.2 billion** are allocated for the committed projects, which have been budgeted in the Five Year Plan (2002-2007) or are about to be constructed in a few years, and **LE 41.6 billion** are necessary for newly proposed infrastructure development in addition to the committed projects. It is noted that Metro Line 3 is included in the committed project package. The economic justification of the LE 41.6 billion investment was examined in terms of the economic benefit against the cost through a cost-benefit analysis. The results are:

- **B/C ratio** (at 12% discount rate): **1.77**.
- **EIRR** (Economic Internal Rate of Return): **20.1%.**

These indicators are considerably favorable, and it can be concluded that the proposed Master Plan is economically feasible, therefore, implementation should be pursued.

FINANCIAL RESOURCE MOBILIZATION

The Government should strive to deliberately procure and allocate the funds for the transport infrastructure projects through:

1) Introduction of "User Pay Systems" such as a toll system for development of the proposed expressway network and a parking charge system;
2) Restructuring of the current public transport fare system;
3) Preparation of proper guidelines and regulations for the Public-Private Partnership scheme for development of public transport facility and service operation; and
4) Pursuance of external resources from international aid community to support the implementation.

NECESSARY URGENT ACTIONS

Out of the proposed projects/programs, the following three are recommended to be urgently taken into action with collective efforts by relevant authorities.

1) All committed projects are expected to be implemented without delay in the short-term. In particular, the construction of **Metro Line 3** should be urgently initiated to structure one of the significant stems of the public transport corridors.

2) The CREATS Master Plan shall be verified and shared among the stakeholders, and expected to be authorized as the policy guidelines for the medium-term transport sector investment program in GCR.
3) For the above reason and the inter-ministerial coordination, the proposed Cairo Metropolitan Transport Bureau (CMTB) needs to be urgently established.

MONITORING OF THE CREATS MASTER PLAN

The CREATS Master Plan is a blueprint based on the long-term perspectives and visions, therefore, should be periodically (every five years) monitored so as to meet with the reality along with socioeconomic changes. To this end, the CREATS database needs to be periodically updated to support rational decision-making for transport investments. ***ENIT*** shall be responsible for such technical and professional tasks.

THE WAY FORWARD

CREATS is a comprehensive effort which integrates approaches designed to mitigate urban transport problems and contribute to the sustainable development of the Greater Cairo Region. The transport strategy embedded in the Master Plan is concurrently intended to support an efficient economic structure of the region, strengthen linkages with other parts of Egypt and provide a base for market-oriented transport activity. Economic expansion within Egypt is well underway; continuing improvements in productivity and well-being are expected. As economic growth continues, changes in transport activities and behavior will follow suit. Thus, the foci of transport planning must gradually shift from alleviation of present deficiencies to realization of a transport system founded upon sustainable evolution and integrated, mutually supportive transport solutions. This strategy is particularly valid, given the 20-year planning horizon.

The components of the Master Plan diversify beyond the traditional “hardware” concepts associated with infrastructure provision. Additional key elements are “software” aspects, that is, available technology, international standards, and multi-modal integration requirements; “humanware” needs, or the cultivation of human resources via the designation of training and education programs as well as other requirements for developing expertise; and, “sustainability”, that is, the notion that the planning process must allow Egyptian stakeholders to participate in visualizing and shaping their own future. This is of substantial importance in terms of ownership building if the Master Plan is to be adopted and used by the people and their elected officials.

The proposed Cairo Metropolitan Transport Bureau is seen as being particularly relevant in this regard. It is a central mechanism for integrating transport policy, systems, organizations and operation into a unified force that transcends the current fragmented approach to problem solving. The immediate focus for the Bureau should be threefold, that is, initiate a review of policies and regulations related to transport; define appropriate legal mechanisms which support and foster an integrated approach to the provision of urban transport; and, initiate implementation of the central tenets of the Master Plan.

The path to success will not be easy; many difficult decisions lie ahead. It is unavoidable that transport policy formulation involves an element of trade-off between conflicts of interest. It is therefore, as are other elements of Egyptian society, influenced by political processes. However, with dedicated support of the people, and once unified policy and financial responsibilities are properly set in place, it is possible to create institutional and financial arrangements which better reflect the complex interactions within the urban transport sector. That is how the fundamental issues of urban transport can be resolved.