JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
CABINET OF MINISTERS
MUNICIPALITY OF BAKU, AZERBAIJAN

THE STUDY ON URBAN TRANSPORT IMPROVEMENT IN THE CITY OF BAKU IN THE REPUBLIC OF AZERBAIJAN

FINAL REPORT

MARCH 2002

CENTRAL CONSULTANT INC.
NIPPON KOEI CO., LTD.

US$ 1 = 4,700 Meant
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Preface

In response to the request from The Government of the Republic of Azerbaijan, The Government of Japan decided to formulate The Study on Urban Transport Improvement in The City of Baku in The Republic of Azerbaijan and entrusted the Study to Japan International Cooperation Agency (JICA).

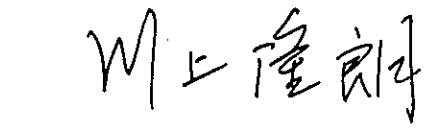
JICA sent a Study Team to Azerbaijan five times between October, 2000 and March, 2002. The Study Team was headed by Mr. Nakamura and composed of members of Central Consultant Inc. and Nippon Koei Co., Ltd.

The Team held discussions with the officials concerned of The Government of the Republic of Azerbaijan, and conducted field surveys in the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the projects and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of The Government of the Republic of Azerbaijan for their close cooperation extended to the team.

March, 2002



Takao Kawakami
President
Japan International Cooperation Agency

March, 2002

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

Dear Sir,

Letter of Transmittal

We are pleased to submit to you the study report on Urban Transport Improvement in The City of Baku in The Republic of Azerbaijan.

This Study was conducted by Central Consultant Inc., in association with Nippon Koei Co., Ltd., under a contract to JICA, during the period of September, 2000 to March, 2002. In conducting The Study, we have examined the feasibility and rationale of the project with due consideration to the present situation of The Republic of Azerbaijan and formulated the Urban Transport Improvement Plan in The City of Baku in The Republic of Azerbaijan.

We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA and Baku Executive Power. We would also like to express our gratitude to the officials concerned of The Cabinet of Ministers and The Embassy of Japan in The Republic of Azerbaijan throughout our field survey.

We hope this report will contribute to the further promotion of the projects.

Very truly yours,

Akio Nakamura
Team Leader
The Study on Urban Transport Improvement in The City of Baku in The Republic of Azerbaijan

Executive Summary

1. Introduction

The Study Team conducted field survey from October 2000 to March 2002.

The objectives of this Study are shown below:

(i) To formulate an Urban Transport Improvement Plan for Baku City (M/P) with target year of 2020;

(ii) To conduct a feasibility study on priority projects (F/S); and

(iii) To carry out technology transfer through the implementation of the Study.

2. Socio-economic Conditions

Data and information on socio-economic conditions of Baku City as a background of urban transport activities and land use were analyzed.

GDP per capita (2000):	619USD
Population of Baku (2000):	2,025 thousand persons (including 91 thousand refugees and 145 thousand of IDP)
Population growth rate:	- 0.3% (1989 – 2000)
Population density:	220 pers./ha. (central area), 75-90 pers./ha (district including industrial area)
Motorization rate:	75 veh./1,000 pers.

3. Land Use and Environmental Condition

It was proved that there exists room for the absorption of increased population and the possibility of redevelopment in the city center in Baku because 40% of residential area is still occupied by buildings with a single floor and idle lands are observed in Microrayon and Ahmedli/Gunesli districts.

It was clarified that in Azerbaijan the EIA procedure is applicable to all economic activities, and the principles for the EIA implementation are defined in “Law of the Republic of Azerbaijan on Environmental Protection (1999)”.

4. Person Trip Characteristics

In this Study, various traffic surveys were carried out to identify traffic characteristics. Person Trip Survey revealed that the average trip rate is 2.04 trips/day, and the average trip rate of male is greater than that of female. Also it revealed that trip rate of person belonging to household with car ownership is greater than that without car ownership. Regarding modal split, it was clarified that walking comprised 49%, buses including minibuses 24%, car 17%. Compared to large cities in developed countries, the fact that dependency on the car still remains low was pointed out.

5. Road Facilities and Road Traffic

It was pointed out that within the urban area of Baku, arterial roads usually called avenues form a radial and ring road system, and the roads in the center of the city form a grid pattern. Also, it was clarified that no less than 80% of the total length is paved. However, the deterioration of these roads continues due to the lack of maintenance/repair works.

The traffic volume survey conducted in this Study revealed that the major thoroughfares in the city carry more than 50,000pcu/day.
One-way system is enforced on the grid-form road network in the central area of Baku. Parking on the road is common. It was clarified that in the peak period, the parking spaces on and off the road were occupied nearly to capacity limit in the central area of Baku.

6. Public Transport

According to the statistical data, the number of passengers transported by public transport modes excluding railway and privately operated buses was 471 thousand passengers a day in 1999, 40% of the number in 1995.
On the contrary, the situation that 2,700 minibuses were operated by the private sector in 2000 and those burdened the management of governmental agencies that operate public transport services was identified. .
After the examination of the financial conditions of public transport servicing organizations, it was pointed out that the operation expenditures per 1 manat revenue were 1.75 manats, 6 manats, and 8 manats for buses publicly operated, trams and trolley bus respectively.

7. Problems and Issues

The following traffic problems were pointed out: aggravation of transport infrastructure due to the lack of funds in public sector; managerial problem in public transport; shortage of parking facilities in the central area of Baku; disturbance of traffic by on-road parked vehicles; presence of bottleneck intersections; and traffic congestion caused by the increase of minibuses.
Based on the analysis of the traffic problems and their background, introduction of traffic demand management measures, formation of appropriate public transport network and transferring system, and necessity of fund raising are identified as important issues in Baku City.

8. Socio-economic Frame

Future population frame of Planning Area was projected to be 2,200 thousand persons in 2020. Per capita GDP is expected to increase to 1,996 USD in 2020 in constant 2000 dollar prices. The car ownership rate was projected to increase to 165 veh. per 1,000 population in 2020.

9. Future Urban Structure

Future urban form was proposed to restrain the expansion of future traffic load by maintaining the present compact urban form and form some urban cores at transport nodal points.
The future land use pattern is derived from proposed urban structure. Expansion of CBD to the east and north, land use conversion from industrial area in the central Baku to housing area, housing development in the southwest, new commercial areas to be developed, and all redevelopment of low density housing into high densities are incorporated in future land use.

10. Future Transport Demand

Trip rate per person in the year 2020 was estimated to reach 2.71 trips in 2020 from 2.04 in 2000.

The modal share of vehicle as a representative transport mode for trip in 2020 was forecast to increase further from existing 16.9% to 31.3% in Do-nothing case.
The forecast result also showed dispersed reaches with large congestion rate due to the large traffic volume compared with capacity.

11. Planning Goals

The goals for the urban transport improvement plan in the city of Baku in this Study were established as follows:

a) Improvement of Mobility and Sustainability
b) Realization of Urban Transport System Harmonized with Environment

In addition, new transport policies and urban transport improvement concepts to attain planning goals were proposed for public transport corridors, public transport system in the central area, transferring system, road corridors, parking facilities, traffic moderation, traffic safety, and traffic control system.

12. Urban Transport Improvement Plan Formulation

Evaluation of mobility and environmental load was comprehensively made. The alternative comprising concept oriented road network, parking restriction in the central area of Baku and public transport network including two subway line construction corresponding to the congested road section is selected as the base for the urban transport improvement plan in this Study.

13. Road Sector Improvement Plan

The road sector improvement plan containing elements below was proposed from the viewpoints of capacity improvement, accessibility improvement, traffic restraining and traffic environment improvement.

Network:	6 radial and 4 ring arteries including Ring Road accessing Baku Port to form Great Silk Road.
Road projects:	corridor development projects, projects for formation of the urban structure, area development projects, and network improvement projects
Traffic management projects:	flexible application of one-way system, on-road parking measure geared to one-way system, and systematized traffic control system (central traffic control system)

14. Public Transport Improvement Plan

Public transport improvement plan shown below was proposed to improve transport capacity to meet future transport demand and to improve accessibility.

Public transport projects:	extension and construction of four subway routes, rehabilitation of tram and trolley buses, introduction of large buses, utilization of existing railway for urban transport, and improvement of public transport in the city center
Inter-modal facility projects:	multi-modal terminal construction, fringe terminal arrangement, etc.

15. Action Plan

After the comparison of own funds, subsidy, loans, and new tax (ear-marked tax), ear-marked tax to apply to the investment in infrastructure in a long term was considered to be preferable for the public sector operating public transport. For the improvement of financial condition of the public sector that operates public transport, the necessity of subsidy and increase of fare based on the beneficiary pay principle was pointed out. Necessity to determine an appropriate balance of subsidy and revenue from fares corresponding to each transport means after prudent examination was recommended. And principle for subsidy was stated.

Establishment of Coordinating Committee composed of various organizations involved in the urban transport was recommended. This Committee is expected to exchange and adjust the opinions on transport policies, plans and operation among relevant organizations.

16. Evaluation of Urban Transport Improvement Plan

Increase in average running speed of vehicles on road and average operation speed of public transport, expansion of covering area by public transport from the city center, EIRR, and environmental impact by the realization of proposed Urban Transport Improvement Plan were evaluated. It was clarified that the Urban Transport Improvement Plan would have significant effect on mobility improvement and ease of environmental loads shown below.

EIRR:	20%
Expected average running speed of vehicles:	32.9km/h （2020）
Expected average operation speed of public transport:	25km/h（2020）
Modal share of public transport:	29.4% (2020)
Environmental effect:	decrease of CO_2 by 440 thousand ton per year

Implementation program for the efficient attainment of goals was formulated with due consideration of budgetary constraint.

Following priority projects to be further studied, commencement of which is expected within a few years after this Study, were selected

17. Large Bus Introduction

This project was proposed to replace minibuses with heavy transport demand with large buses to ease traffic congestion in the central area and ease environmental loads.]

Minibus routes were evaluated from the viewpoints of economic feasibility, road condition, and relationship with other public transport modes, and staged plan comprising Phase I, II, and III was formulated. The large bus introduction for two routes in Phase I showed high EIRR of 19%.

18. Bottleneck Improvement

This Project was proposed to remove the causes of congestion at present or in near future and to secure smooth traffic flows. Five points were selected.

In case of intersection, rearrangement of entry and exit, allocation of sufficient waiting section length, and grade separation were the main contents of improvement. In case of road section, widening of the road was major improvement.

The EIRRs of each improvement were 12% - 116%.

19. Tram Rehabilitation

This Project proposed to rehabilitate and renovate existing tram as one of main public transport means in Baku as observed in western European countries. Introduction of new type tram, more comfortable and more rapid in the distant future was proposed.

17% of Economic Internal Rate of Return (EIRR) was obtained. Therefore, this project was initially considered to be feasible. However, financial analysis revealed that this rehabilitation project would not be financially feasible.

20. Introduction of Central Traffic Control System

This Project proposed to solve traffic congestion problem in the central area of Baku by systematized traffic control. At the same time, for effective introduction, one-way system and parking policy were also proposed.

EIRR was estimated at 11%.

21. Improvement of 20 January Intersection

Improvement of 20 January intersection and Azizbekov intersection projects were proposed as a packaged project including the capacity improvement of intersection and rearrangement of terminal function.

High EIRR of 20% was estimated.

22. Improvement of Azizbekov Intersection

Redevelopment of the eastern terminal of the station in order to improve the convenience of accessibility was proposed. Grade separation was proposed by elevating Moskva Ave. to accommodate future traffic volume. In addition, as the traffic capacity at the intersection is not enough in the level crossing, it is proposed to change it to grade separation. Formation of urban core is expected in this area by utilizing the potential of public transport service.

EIRR was estimated at 12%.

23. Conclusion and Recommendations

The appropriateness of the proposed Urban Transport Improvement Plan to achieve the established goals was ascertained by evaluation criteria. Authorization of proposed Urban Transport Improvement Plan was recommended.

Also fund raising for the realization of proposed Urban Transport Improvement Plan, establishment of a new committee, adoption of zoning system for land use were proposed.

As for the priority projects, evaluation and recommendation were made for each project. And prompt implementation of the projects was recommended.

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Abbreviations

AADT	Annual Average Daily Traffic
AMGB	Asphalt Mix on Granular Base
AZM	Azerbaijan Manat
B & B Terminal	Bus and Bus Terminal
B/C	Benefit Cost Ratio
BEP	Baku Executive Power
BOT	Build-Operate-Transfer
CBD	Central Business District
CCU	Communication Control Unit
CIS	Commonwealth of Independent States
CO	Carbon monoxide
D/D	Detailed Design
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EU	European Union
FIRR	Financial Internal Rate of Return
FS	Feasibility Study
FSU	Former Soviet Union
GDP	Gross Domestic Product
HDM4	Highway Design and Maintenance Standard Model (version 4)
HDR	High Density Residential area
HOV	High Occupancy Vehicle
IDP	Internally Displaced People
IEE	Initial Environmental Examination
IRI	International Roughness Index
ITS	Intelligent Transport System
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
LDR	Low Density Residential area
LRT	Light Rail Transit
MDF	Main Distributing Frame
MDM	Modem
MDR	Medium Density Residential area
MP	Master Plan
NPV	Net Present Value

NOx	Nitrogen Oxide
OD	Origin & Destination
PCU	Passenger Car Unit
PFI	Private Finance Initiative
PT	Person Trip
PTOD	Person Trip Origin-Destination
STRADA	System for Traffic Demand Analysis
SW	Scope of Work
TACIS	Technical Assistance for CIS Countries
TDM	Traffic Demand Management
TRACECA	Transport Corridor Europe Caucasus Asia
TSM	Traffic System Management
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	US Dollar
VCR	Volume Capacity Ratio
VOC	Vehicle Operation Cost
VTOD	Vehicle Trip Origin-Destination

Work Shop


Old City


20 January Intersection


28 May Square


Industrial Area in Central Baku


Road Congestion


Minibus Operation


Road Repair Work

Grade Separation of Railway and Road

Frontage of Khatai Subway Station

Baku Central Railway Station

Pipelines (near Azizbekov Sq.)

Nizami Mall

Tram Operation

Tram Depot

Underpass (Neftchilar Ave.)