

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
As of October, 2001

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).

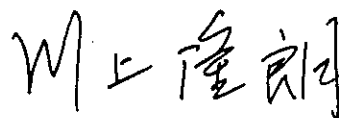
JICA sent a Study Team to Azerbaijan five times between October, 2000 and March, 2002. The Study Team was headed by Mr. Nakamura and composed of members of Central Consultant Inc. and Nippon Koei Co., Ltd.

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

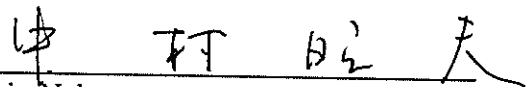
We are pleased to submit to you the study report on Urban Transport Improvement in The City of Baku in The Republic of Azerbaijan.

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.

Table of Contents for Main Report

I. INTRODUCTION

CHAPTER 1	INTRODUCTION	1-1
1.1	Introduction to the Study	1-1
1.2	Outline of the Study.....	1-6
1.3	Organization of the Study.....	1-8

II. EXISTING CONDITIONS

CHAPTER 2	SOCIO-ECONOMIC CONDITIONS.....	2-1
2.1	Changes in GDP	2-1
2.2	Socio-economic Situation in the Study Area.....	2-4
2.3	Existing Institution	2-8

CHAPTER 3	LAND USE AND ENVIRONMENTAL CONDITION.....	3-1
3.1	Present Institutional System for Physical Planning	3-1
3.2	Land Use Patterns.....	3-4
3.3	Environmental Condition	3-18

CHAPTER 4	PERSON TRIP CHARACTERISTICS	4-1
4.1	Types of Traffic Surveys Conducted.....	4-1
4.2	Person Trip Survey	4-4
4.3	Public Vehicle Occupancy Survey	4-27
4.4	Railway OD Interview Survey	4-29
4.5	Bus Terminal Survey	4-33
4.6	Intersection Traffic Movement Survey.....	4-40
4.7	Travel Behavior Survey.....	4-41
4.8	Parking Survey	4-62
4.9	Taxi Movement Survey	4-65
4.10	Truck Movement Survey	4-68

CHAPTER 5	ROAD FACILITIES AND ROAD TRAFFIC.....	5-1
5.1	General	5-1
5.2	Existing Road Condition in Baku	5-6
5.3	Existing Road Traffic	5-33
5.4	Parking Conditions	5-60
5.5	Traffic Management System	5-66

CHAPTER 6	PUBLIC TRANSPORT.....	6-1
6.1	General	6-1
6.2	Subway (Metro).....	6-1
6.3	Buses, Trams and Trolley Buses	6-13

6.4	Taxis	6-22
6.5	Railway.....	6-23
6.6	Airport	6-27
6.7	Intermodal Facilities.....	6-28
6.8	Future Policies Proposed by the Transport Department of Baku Municipality.....	6-38
6.9	Problems and Issues of Public Transport.....	6-39

CHAPTER 7 PROBLEMS AND ISSUES 7-1

7.1	Background of Transport Problems.....	7-1
7.2	Issues on Urban Transport Improvement	7-8

III. FUTURE TRANSPORT DEMAND

CHAPTER 8 SOCIO-ECONOMIC FRAME..... 8-1

8.1	Population Projections.....	8-1
8.2	GDP and Income of Households	8-4
8.3	Income and Car Ownership	8-6
8.4	Employment Levels and Sectoral Distribution.....	8-9

CHAPTER 9 FUTURE URBAN STRUCTURE 9-1

9.1	The Present Urban Form	9-1
9.2	Alternative Urban Growth Forms.....	9-2
9.3	Recommended Urban Form.....	9-3
9.4	Distribution of Residences and Work Places.....	9-12

CHAPTER 10 FUTURE TRANSPORT DEMAND..... 10-1

10.1	Introduction	10-1
10.2	Forecasting Trip Production	10-1
10.3	Forecasting Trip Generation and Attraction	10-5
10.4	Forecasting Trip Distribution	10-8
10.5	Forecasting Modal Split	10-13
10.6	External Zone Demand.....	10-18
10.7	Future Traffic Assignment.....	10-19
10.8	Transport Demand in 2010.....	10-25

IV. URBAN TRANSPORT IMPROVEMENT PLAN

CHAPTER 11 PLANNING GOALS..... 11-1

11.1	Planning Goals.....	11-1
11.2	The New Traffic Concept.....	11-3

CHAPTER 12 URBAN TRANSPORT IMPROVEMENT PLAN FORMULATION..... 12-1

12.1	Required Capacity for Network.....	12-1
12.2	Possible Measures	12-7

12.3	Constraints for Planning	12-14
12.4	Network Alternatives.....	12-20
12.5	Evaluation of Alternatives	12-29
12.6	Transport Improvement Master Plan.....	12-42
CHAPTER 13 ROAD SECTOR IMPROVEMENT PLAN.....		13-1
13.1	Overview	13-1
13.2	Road Improvement Plan.....	13-3
13.3	Traffic Management Plan.....	13-44
13.4	Other Road-related Facilities.....	13-79
13.5	Road Sector Project List.....	13-87
CHAPTER 14 PUBLIC TRANSPORT IMPROVEMENT PLAN.....		14-1
14.1	Overview	14-1
14.2	Public Transport Improvement Plan.....	14-3
14.3	Public Transport Project List.....	14-42
CHAPTER 15 ACTION PLAN.....		15-1
15.1	Financial Resource Plan	15-1
15.2	Operation and Management Plan	15-11
15.3	Institutional Reform Plan	15-19
CHAPTER 16 EVALUATION OF URBAN TRANSPORT IMPROVEMENT PLAN		16-1
16.1	Economic Evaluation.....	16-1
16.2	Financial Analysis	16-4
16.3	Environmental Evaluation	16-10
16.4	Priority Project.....	16-25
 V. PRIORITY PROJECT STUDY		
CHAPTER 17 LARGE BUS INTRODUCTION		17-1
17.1	Objectives.....	17-1
17.2	Improvement Plan	17-5
17.3	Project Evaluation	17-20
17.4	Conclusion.....	17-33
CHAPTER 18 BOTTLENECK IMPROVEMENT		18-1
18.1	Objectives.....	18-1
18.2	Improvement Plan	18-3
18.3	Project Evaluation	18-48
18.4	Conclusion.....	18-62
CHAPTER 19 TRAM REHABILITATION		19-1
19.1	Objectives.....	19-1
19.2	Improvement Plan	19-4

19.3	Project Evaluation	19-8
19.4	Conclusion.....	19-19
	Reference.....	19-21

CHAPTER 20 CENTRAL TRAFFIC CONTROL SYSTEM INSTALLMENT 20-1

20.1	Objectives.....	20-1
20.2	Improvement Plan	20-15
20.3	Project Evaluation	20-28
20.4	Conclusion.....	20-38

CHAPTER 21 IMPROVEMENT OF 20 JANUARY INTERSECTION..... 21-1

21.1	Objectives.....	21-1
21.2	Improvement Plan	21-3
21.3	Project Evaluation	21-34
21.4	Conclusion.....	21-41

CHAPTER 22 IMPROVEMENT OF AZIZBEKOV INTERSECTION..... 22-1

22.1	Objectives.....	22-1
22.2	Improvement Plan	22-4
22.3	Project Evaluation	22-37
22.4	Conclusion.....	22-43

VI. CONCLUSION AND RECOMMENDATION

CHAPTER 23 CONCLUSION AND RECOMMENDATION..... 23-1

List of Tables

Table 2.1.1	Main Indicators of Economic Activity	2-1
Table 2.1.2	Changes in Sectoral GDP: Index of Change over the Previous Year (measured in comparable prices)	2-1
Table 2.1.3	Balance of Payments	2-2
Table 2.1.4	Employment by Sectors of the Economy	2-3
Table 2.1.5	Changes in the Main Macro Aggregates	2-3
Table 2.2.1	Population in the Study Area.....	2-4
Table 2.2.2	Industrial Production in 1999	2-6
Table 2.2.3	Share of Non-state Sector in Industrial Production	2-6
Table 2.2.4	Comparison of Motorization Rate	2-7
Table 2.3.1	Responsibilities of Heads and Deputy Heads in the Baku Executive Power	2-20
Table 3.2.1	Land Use in Apsheron Peninsular	3-10
Table 3.2.2	Land Use in Baku City	3-11
Table 3.2.3	Residential Density in the City.....	3-14
Table 3.2.4	Real Estate Ownership in Azerbaijan.....	3-15
Table 3.3.1	Air Quality Monitoring Data.....	3-20
Table 3.3.2	Residence of Refugee and Internally Displaced People	3-22
Table 3.3.3	Environmental Items to be Considered	3-23
Table 3.3.4	Environmental Legislation	3-23
Table 3.3.5	Environmental Items to be Considered in the EIA Implementation.....	3-24
Table 4.1.1	Summary of Traffic Survey Conducted.....	4-1
Table 4.2.1	Final HH Samples Interviewed by District.....	4-5
Table 4.2.2	Persons Aged 5 Years and above Interviewed	4-5
Table 4.2.3	Distribution of Household Size of Samples	4-7
Table 4.2.4	Vehicle Ownership of Sampled Households	4-7
Table 4.2.5	Accessibility to Public Transportation	4-8
Table 4.2.6	House Ownership of Sampled Households	4-8
Table 4.2.7	Residence Status of Sampled Households.....	4-8
Table 4.2.8	Length of Stay of Sampled Households	4-9
Table 4.2.9	Occupation Group Distribution of Sampled Persons.....	4-9
Table 4.2.10	Number of Trip by Purpose.....	4-13
Table 4.2.11	Zonal Trip Generation by Purpose	4-15
Table 4.2.12 (1)	District Zone OD Matrix by Travel Mode.....	4-19
Table 4.2.12 (2)	District Zone OD Matrix by Travel Mode.....	4-20
Table 4.2.13	District Zone OD Matrix by All Modes	4-21
Table 4.2.14	Number of Trip by Travel Mode and Purpose.....	4-22
Table 4.2.15 (1)	Zonal Trip Generation and Attraction by Mode	4-25
Table 4.2.15 (2)	Zonal Trip Generation and Attraction by Mode	4-26
Table 4.3.1	Total Daily Subway Services by Direction by Hour	4-27
Table 4.3.2	Average Passenger Loading of Subway Train by Direction	4-27
Table 4.3.3	Total Passenger Estimate Crossing the Screen Line.....	4-28
Table 4.4.1	Frequency of Train Services at Baku Station	4-29
Table 4.4.2	Total Respondents and Gender Distribution	4-30
Table 4.4.3	Trip Purpose of Respondents.....	4-30
Table 4.4.4	Access and Egress Modes by Type of Train Passengers	4-31

Table 4.4.5	Average Travel Time of Railway Passengers.....	4-31
Table 4.4.6	Average Passenger Loading and Total Passengers.....	4-33
Table 4.5.1	Location of Major Bus Transfer Point Survey	4-33
Table 4.5.2	Percent Share of Buses by Types at Survey Terminals	4-34
Table 4.5.3	Frequency of Buses by Type of Operation.....	4-35
Table 4.5.4	Type of Buses Used by Respondents	4-38
Table 4.5.5	Trip Purpose of Respondents.....	4-38
Table 4.5.6	Access Modes of Respondents	4-39
Table 4.5.7	Egress Modes of Respondents.....	4-39
Table 4.6.1	Results of Intersection Traffic Movement Survey.....	4-40
Table 4.7.1	Total Bus Arrivals and Departures at Squares.....	4-44
Table 4.7.2	Bus Arrivals and Departures by Areas, by Types at 28 May Square	4-45
Table 4.7.3	Total Bus Arrivals and Departures at 20 January Square.....	4-46
Table 4.7.4	Arriving Passengers Interviewed at 28 May Square.....	4-47
Table 4.7.5	Arriving Passengers Interviewed at 20 January Square	4-47
Table 4.7.6	Mode Transfer Movement within the 28 May Square.....	4-50
Table 4.7.7	Mode Change Movements in the 20 January Square	4-51
Table 4.7.8	Share of Transfer Passenger between Modes at May 28 Square.....	4-52
Table 4.7.9	Share of Transfer Passenger between Modes at Jan 20 Square.....	4-52
Table 4.7.10	Traffic Volume Counting Results at 28 May Square	4-54
Table 4.7.11	Traffic Volume Counting Results at 20 January Square	4-55
Table 4.7.12	Traffic Composition of Total Entry Traffic at 20 January and 28 May Squares	4-56
Table 4.7.13	Parking Demand by Area at 20 January Square	4-59
Table 4.7.14	Parking Demand by Area at 28 May Square	4-60
Table 4.8.1	Parking Purpose Distribution of Respondents.....	4-64
Table 4.8.2	Duration of Parking on S.Vurgun and Bulbul Streets.	4-64
Table 4.8.3	Frequency of Parking Users on S.Vurgun and Bulbul Streets.....	4-65
Table 4.8.4	Parking Payment on S.Vurgun and Bulbul Streets.....	4-65
Table 4.8.5	Willingness To Pay for Parking Facility	4-65
Table 4.9.1	Taxi Companies Operating in Baku	4-66
Table 4.9.2	Number of Samples taken From Taxi Companies.....	4-66
Table 4.9.3	Number of Passengers in Taxi.....	4-67
Table 4.9.4	Average Travel Time of Taxi Trips.....	4-67
Table 4.9.5	Trip Purpose of Taxi Trips	4-67
Table 4.10.1	List of Operating Companies and Number of Trucks Owned.....	4-68
Table 4.10.2	Total Truck Sampled and Average No. of Trips	4-69
Table 4.10.3	Average Travel Time of Truck Trips	4-69
Table 5.1.1	Road Length by Road Surface in Azerbaijan	5-2
Table 5.1.2	Composition Rates of the Length of each Road Category	5-2
Table 5.1.3	The Classification of Roads in Urban Area.....	5-5
Table 5.1.4	The Classification of Roads in Suburban Area	5-5
Table 5.2.1	The Road Length and Pavement Square in the 11 Districts of Baku City.....	5-19
Table 5.2.2	Tax for Cargo Trucks from Foreign Countries.....	5-21
Table 5.2.3	Cargo Handling Volume of the Baku Port (in 1,000 tones)	5-22
Table 5.2.4	Financial Condition of the Baku Port (1999)	5-22
Table 5.2.5	The Annual Expenditure on Roads in Baku	5-30
Table 5.3.1	Summary of Daily Total Traffic Volume at Survey Locations	5-33
Table 5.3.2	Traffic Volume across Screen Line.....	5-37

Table 5.3.3	Traffic Volume at Cordon Line Survey Locations	5-40
Table 5.3.4	Traffic Composition at the Major Stations	5-40
Table 5.3.5	Modal Share of Cordon Line Survey.....	5-42
Table 5.3.6	Cordon Line OD Matrix by Travel Mode	5-44
Table 5.3.7	Summary of Average Travel Speed by Direction by Mode	5-45
Table 5.3.8	Accidents by Type (total numbers of accidents, persons killed and persons injured).....	5-54
Table 5.4.1	Parking Prohibition Area (the streets with the traffic sign).....	5-62
Table 5.5.1	List of One-way Streets and Roads	5-69
Table 5.5.2	Vehicle Registration by District by Type (31/October/2000)	5-72
Table 6.1.1	Public Transport Mode Facilities in Baku.....	6-1
Table 6.2.1	Number of Passengers Using the Baku Subway.....	6-2
Table 6.2.2	No. of Passengers Using the Subway Station (1999, incoming)	6-5
Table 6.2.3	Annual Incomes of Baku Subway	6-8
Table 6.2.4	Profit/Loss Conditions of the Baku Subway	6-11
Table 6.3.1	Recent Trend of Bus Operations by the Transport Department	6-14
Table 6.3.2	Past Trend of Licensed Minibuses.....	6-15
Table 6.3.3	Tram and Trolley Bus Operations (1).....	6-19
Table 6.3.4	Tram and Trolley Bus Operations, 2000 (2).....	6-19
Table 6.3.5	Number of Passengers by Publicly-operated Transport Mode	6-20
Table 6.3.6	Financial Condition of Public Bus Operation.....	6-21
Table 6.3.7	Financial Condition of Tram Operation	6-21
Table 6.3.8	Financial Condition of Trolley Bus Operation	6-21
Table 6.3.9	Summary of Financial Conditions of Transport Department	6-22
Table 6.5.1	Suburban Railway Operation	6-23
Table 6.5.2	Number of Passengers by Suburban Railways	6-24
Table 6.5.3	Number of Railway Passengers Originated/Destined from/to Baku	6-24
Table 6.5.4	Financial Condition of Suburban Railways.....	6-25
Table 6.6.1	Transport Statistics of Baku Airport.....	6-27
Table 6.7.1	Number of Buses Arriving/Departing by Each Bus Stop in and around the 20 January Square	6-32
Table 6.9.1	Organizations Controlling Fares.....	6-43
Table 8.1.1	Population of the Baku Administrative District and City-like Towns (1999).....	8-2
Table 8.1.2	Population Projection	8-3
Table 8.2.1	Main Indicators of Economic Activity	8-4
Table 8.2.2	Alternative GDP Growth Projections by Different Organizations	8-5
Table 8.2.3	GDP Growth Projections.....	8-5
Table 8.2.4	Monthly Household Income	8-6
Table 8.2.5	GDP per capita in 2020	8-6
Table 8.3.1	Present and Projected Car Ownership	8-8
Table 8.4.1	Number of Workers in Baku City by Sector	8-9
Table 8.4.2	Sectral Employment	8-10
Table 9.3.1	Residential Density Norms Used in Azerbaijan	9-5
Table 9.4.1	Population Projection by Residence Density.....	9-12
Table 9.4.2	Present Land Use by Traffic Zone and Major Land Use Category	9-15
Table 9.4.3	Land Use under Proposed Urban Structure in Baku.....	9-17

Table 10.2.1	Trip Production Model Calibration Results.....	10-2
Table 10.2.2	Trip Production Model Input Data	10-3
Table 10.2.3	Trip Rate and Number of Trips by Household Car Ownership and Trip Purpose.....	10-4
Table 10.3.1	Trip Distribution Model Parameters.....	10-5
Table 10.4.1	Inter Zonal Model Parameters	10-8
Table 10.4.2	Intra Zonal Trip Rate	10-9
Table 10.5.1	Walking Split Model	10-14
Table 10.5.2	Intra Zonal Modal Share.....	10-15
Table 10.5.3	Assumption of Travel Time Simulation	10-16
Table 10.5.4	Assumption of Travel Cost Simulation	10-16
Table 10.5.5	Model Parameters of Car-Public and Rail-Bus Split Models	10-16
Table 10.5.6	Trip by Mode in 2000.....	10-18
Table 10.5.7	Trip by Mode in 2020 (Do-nothing case).....	10-18
Table 10.6.1	Growth Factor for External Zone Demand.....	10-18
Table 10.7.1	Occupancy Rate and Passenger Car	10-19
Table 10.7.2	Number of Increment and Each Rate	10-19
Table 10.7.3	Flee Flow Speed and Ideal Capacity of Road Link	10-20
Table 10.8.1	Trips by Mode in 2000, 2010 and 2020 (Do-nothing case).....	10-25
Table 12.1.1	Capacity Requirement for Main Sections.....	12-1
Table 12.1.2	Comparison of Future Passenger Flows and Capacity	12-5
Table 12.3.1	Budgetary Expenditures for Transport and Communications	12-17
Table 12.3.2	Budgetary Expenditures for Transport and Communications (1999).....	12-17
Table 12.3.3	Budgetary Expenditures for Transport and Communications by Country	12-17
Table 12.3.4	Precondition for Planning from Environmental Viewpoint.....	12-18
Table 12.4.1	Alternative Cases.....	12-28
Table 12.5.1	Vehicle Running Cost	12-29
Table 12.5.2	Evaluation Results of Alternatives	12-32
Table 12.5.3	Average Running/Operation Speed (Simulation Results).....	12-33
Table 12.5.4	Modal Split Result in Alternative Cases.....	12-36
Table 13.2.1	Comparison of Each Project vs. Do-nothing Case	13-3
Table 13.2.2	Road Length of the Master Plan Network	13-3
Table 13.2.3	Cross Section of Road by Class.....	13-8
Table 13.2.4	Type of Intersection (principle).....	13-9
Table 13.2.5	Project Package	13-15
Table 13.2.6	Projects of the Corridor Developments	13-15
Table 13.2.7	Projects of Formation of the Urban Structure	13-16
Table 13.2.8	Projects of the Area Development.....	13-16
Table 13.2.9	Projects of Network Improvement	13-17
Table 13.2.10	General Problems and Countermeasures of Existing Intersections	13-19
Table 13.2.11 (1)	List of Improvement of Intersections (1).....	13-23
Table 13.2.11 (2)	List of Improvement of Intersections (2).....	13-24
Table 13.2.11 (3)	List of Improvement of Intersections (3).....	13-25
Table 13.2.11 (4)	List of Improvement of Intersections (4).....	13-26
Table 13.2.11 (5)	List of Improvement of Intersections (5).....	13-27
Table 13.2.12	Selection of Improvement Project of the Intersection	13-28
Table 13.2.13	Recent Rehabilitation Work	13-31

Table 13.2.14	Maintenance Group of the Arterial Road Network	13-33
Table 13.2.15	Maintenance Group of the Tertiary and Access Road Network.....	13-33
Table 13.2.16	Grouping of Roads for Maintenance Work	13-34
Table 13.2.17	Pavement Parameter by Maintenance Group	13-35
Table 13.2.18	Description of the Alternatives.....	13-36
Table 13.2.19	Details of Routine Maintenance	13-36
Table 13.2.20	Detail of Work Item	13-36
Table 13.2.21	Details of Investment Alternatives	13-37
Table 13.2.22	Unit Cost of Maintenance Work (USD).....	13-37
Table 13.2.23	Total Cost for Each Alternative (2002-2020).....	13-38
Table 13.2.24	Pedestrian Network	13-40
Table 13.2.25	Summaries of the Proposed Selected Pedestrian Passage	13-45
Table 13.3.1	Total pcu-km and pcu-hour before and after the Improvement Plans	13-51
Table 13.3.2	Summaries of the Proposed Parking Locations.....	13-60
Table 13.3.3	Effect of Synchronization of Traffic Signals.....	13-68
Table 13.5.1	Road Sector Project List.....	13-87
Table 14.2.1	Route Information of Existing Tram Route.....	14-11
Table 14.2.2	Characteristics of Modal Choice (2000).....	14-14
Table 14.2.3 (1)	Bus Passenger Demand by Route (2020)	14-17
Table 14.2.3 (2)	Bus Passenger Demand by Route (2020)	14-18
Table 14.2.4	Summary of Trunk Bus Routes	14-19
Table 14.2.5	Effects of Trunk Bus System.....	14-21
Table 14.2.6	Comparison of 20 January Square Planning.....	14-25
Table 14.2.7	Summary of the Proposed New Bus Terminal	14-32
Table 14.2.8	Summary of Proposals for Existing Bus Terminals	14-35
Table 14.2.9	Summary of Proposed LRT Terminal	14-40
Table 14.2.10	Operation Plan and Required Number of Coaches/Vehicles (2020)	14-41
Table 14.3.1	Public Transport Sector Project List.....	14-42
Table 15.1.1	Financial Situation of Public Transport Modes Operated by Public Sector	15-2
Table 15.1.2	Estimated Available Fund in 2002	15-6
Table 15.2.1	Revenue under Different Rate of Free Riders and Different Fare Level.....	15-13
Table 15.2.2	Financial Position of Bakinski Metropolitan under Different Fare Level and Different Rate of Free Riders	15-13
Table 15.2.3	Financial Situation of Bus, Tram and Trolley Bus in 1999.....	15-14
Table 15.2.4 (1)	Revenue under Different Free Rider Ratio and Different Fare Level (Municipal Bus)	15-15
Table 15.2.4 (2)	Financial Balance of Municipal Bus	15-15
Table 15.2.5 (1)	Revenue under Different Free Rider Ratio and Different Fare Level (Tram)	15-15
Table 15.2.5 (2)	Financial Balance of Tram	15-16
Table 15.2.6 (1)	Revenue under Different Free Rider Ratio and Different Fare Level (Trolley Bus)	15-16
Table 15.2.6 (2)	Financial Balance of Trolley Bus	15-16
Table 15.2.7	Financial Position of Subway	15-18
Table 15.2.8 (1)	Financial Position of Municipal Bus	15-18
Table 15.2.8 (2)	Financial Position of Municipal Bus	15-18
Table 15.2.8 (3)	Financial Position of Municipal Bus	15-18
Table 15.3.1	Public Transport Modes within Baku Area and Responsible Organization	15-19
Table 15.3.2	Advantages and Disadvantages of Alternatives	15-21

Table 16.1.1	Project Benefit of Urban Transport Improvement Plan.....	16-1
Table 16.1.2	Project List in the Urban Transport Improvement Plan.....	16-2
Table 16.1.3	Economic Evaluation of Urban Transport Improvement Plan	16-3
Table 16.1.4	Sensitivity Analysis	16-3
Table 16.2.1	Result of Financial Analysis.....	16-9
Table 16.3.1	Estimation of Loads of CO and NOx from Automobiles in 2020.....	16-10
Table 16.3.2	Estimation of Loads of CO2 and Environmental Benefit in 2020.....	16-11
Table 16.3.3	Environmental Items Examined in IEE.....	16-12
Table 16.3.4	Proposed Projects and Main Factors Affecting Environment	16-14
Table 16.3.5 (1)	Site Description	16-15
Table 16.3.5 (2)	Site Description	16-16
Table 16.3.6 (1)	Result of Screening	16-17
Table 16.3.6 (2)	Result of Screening	16-18
Table 16.3.7	Result of Scope.....	16-19
Table 16.3.8	Result of the Scope of Each Project	16-20
Table 16.3.9	Euro Standard for Medium and Large Diesel Vehicle	16-21
Table 17.1.1	Comparison of Merits and Demerits of Minibus and Large Bus in Baku	17-3
Table 17.2.1	Selection of Priority Trunk Bus Routes.....	17-8
Table 17.2.2	Staged Plan for Trunk Bus System.....	17-6
Table 17.2.3	Bus Terminal Improvement.....	17-12
Table 17.2.4	Scheduled Frequency and Headway in the Peak Hour in 2005.....	17-13
Table 17.3.1	Benefits of Large Bus Introduction	17-20
Table 17.3.2	Summary of Large Bus Introduction.....	17-21
Table 17.3.3	Summary of Project Cost.....	17-22
Table 17.3.4	Economic Cost	17-23
Table 17.3.5	Forecast Number of Passengers.....	17-24
Table 17.3.6	Operation Cost in 1999.....	17-25
Table 17.3.7	Consumer Price Index	17-25
Table 17.3.8	Fare Setting Cases	17-26
Table 17.3.9	Factors Affecting Environment with Implementation of Project	17-28
Table 17.3.10	Proposed Priority Route	17-28
Table 17.3.11	Environmental Impacts by Large Bus Introduction.....	17-29
Table 17.3.12	Number of Operated Bus in Peak Hour.....	17-31
Table 17.3.13	Recommended Measures for Mitigation of Environmental Impact	17-33
Table 18.2.1	Selection of Bottlenecks	18-5
Table 18.2.2	The Results of Traffic Phase Calculations (Present and 2010)	18-9
Table 18.2.3	The Results of Traffic Phase Calculations (2020).....	18-9
Table 18.2.4	The Result of Geotechnical Soil Test.....	18-10
Table 18.2.5	Geometric Structure Conditions	18-11
Table 18.2.6	Geometric Structure Conditions	18-15
Table 18.2.7	List of Public Facilities.....	18-16
Table 18.2.8	Geometric Structure Conditions	18-23
Table 18.2.9	List of Public Facilities.....	18-23
Table 18.2.10	The Result of Geotechnical Soil Test.....	18-33
Table 18.2.11	Geometric Structure Conditions	18-33
Table 18.2.12	List of Public Facilities.....	18-33

Table 18.2.13	The Result of Geotechnical Soil Test.....	18-40
Table 18.2.14	Geometric Structure Conditions.....	18-40
Table 18.2.15	List of Public Facilities.....	18-41
Table 18.3.1	Summary of Project Cost.....	18-49
Table 18.3.2	Benefits of the Bottleneck Improvements	18-49
Table 18.3.3	Economic Benefit of the Bottleneck Improvement	18-50
Table 18.3.4	Economic Cost	18-50
Table 18.3.5	Factors Affecting Environment with Implementation of Project	18-51
Table 18.3.6	Environmental Impacts by Reconstruction of Saraykina St.	18-54
Table 18.3.7	Environmental Impacts by Samad Vurgun St. Widening.....	18-56
Table 18.3.8	Environmental Impacts by Middle Ring Road Widening	18-57
Table 18.3.9	Environmental Impacts by Grade Separation of Tbilisi Ave. and Salamzadeh St. .	18-58
Table 18.3.10	Environmental Impacts by Grade Separation of Azadlig Ave. and Z. Bunyadov Ave.	18-59
Table 18.3.11 (1)	Recommended Measures for Mitigation of Environmental Impact by Samad Vurgun Avenue Widening.....	18-60
Table 18.3.11 (2)	Recommended Measures for Mitigation of Environmental Impact by Samad Vurgun Avenue Widening.....	18-61
Table 19.2.1	Future Traffic Demand on Existing Tramlines.....	19-4
Table 19.3.1	Merits of Tram Rehabilitation.....	19-8
Table 19.3.2	Summary of Tram Rehabilitation.....	19-9
Table 19.3.3	Summary of Project Cost.....	19-10
Table 19.3.4	Benefits of the Rehabilitation of Trams	19-10
Table 19.3.5	Economic Cost	19-11
Table 19.3.6	Forecast Number of Passengers.....	19-12
Table 19.3.7	Data on the Revenue and Operation Cost.....	19-13
Table 19.3.8	Fare Level Assumption	19-13
Table 19.3.9	Operation Balance	19-14
Table 19.3.10	Factors Affecting Environment with Implementation of Project	19-15
Table 19.3.11	Environmental Impacts by Tram Rehabilitation	19-16
Table 19.3.12	Decreasing Amount of Air Pollutants by Tram Rehabilitation	19-17
Table 19.3.13	Recommended Measures for Mitigation of Environmental Impact	19-18
Table 20.1.1	Summary of Average Travel Speed by Direction by Mode	20-1
Table 20.1.2	Travel Speed in the Central Area of Baku City (Inbound).....	20-4
Table 20.1.3	Travel Speed in the Central Area of Baku City (Outbound)	20-5
Table 20.1.4	Travel Speed Survey Result on Azadlig Ave. (Car).....	20-6
Table 20.1.5	Travel Speed Survey Result on Rashid Behbudov Ave. (Car).....	20-6
Table 20.3.1	Central Traffic Control System Costs by Phase	20-29
Table 20.3.2	Direct Cost Benefit for Central Traffic Control System by Phase	20-31
Table 20.3.3	Estimated Travel Speed after the Project	20-32
Table 20.3.4	Travel Time Shortening Effect (comparison between the travel surveys 3 months before and 3 months after the service-in-operation).....	20-32
Table 20.3.5	Accident Incidence Reduction Effect (comparison between the travel surveys 6 months before and after service-in operation).....	20-32
Table 20.3.6	Factors Affecting Environment with Implementation of Project	20-34
Table 20.3.7	Environmental Impacts of Introduction of Centralized Signal Control System.....	20-35
Table 20.3.8	Decreasing Amount of Air Pollutants by Centralized Signal Control System	20-37

Table 20.3.9	Recommended Measures for Decrease of Environmental Impact.....	20-37
Table 21.2.1	Directional Traffic Volume at 20 January Intersection	21-4
Table 21.2.2	Table of Results of Traffic Phase Calculations	21-4
Table 21.2.3	Calculation Table of Traffic Phase (Do-nothing case in 2010).....	21-5
Table 21.2.4	Calculation Table of Traffic Phase (Master Plan case)	21-6
Table 21.2.5	Bus Route Numbers Stopping at each Bus Stop.....	21-7
Table 21.2.6	20 January Bus Route (Planning) Frequency	21-7
Table 21.2.7	Peak Hour Bus Frequency and Required Bus Berth.....	21-10
Table 21.2.8	Road Standard and Design Speed for Each Road.....	21-12
Table 21.2.9	Geometric Structure Conditions	21-13
Table 21.2.10	Specifications of Design Vehicle	21-15
Table 21.2.11	Size of Parking Lot per Car	21-15
Table 21.2.12	List of Public Facilities.....	21-16
Table 21.2.13	Comparative Review of Alternative Intersection Plans.....	21-19
Table 21.2.14	Comparison of Rearranged Tramline Routes	21-24
Table 21.3.1	Project Cost	21-34
Table 21.3.2	Benefits of the Improvement	21-35
Table 21.3.3	Economic Benefit.....	21-35
Table 21.3.4	Economic Cost	21-35
Table 21.3.5	Factors Affecting Environment with Implementation of Project	21-36
Table 21.3.6	Environmental Impacts of 20 January Improvement.....	21-38
Table 21.3.7	Recommended Measures for Mitigation of Environmental Impact	21-40
Table 22.2.1	Directional Traffic Volume at Azizbekov Intersection	22-4
Table 22.2.2	Results of Calculations of Traffic Phase	22-5
Table 22.2.3	Calculation Table of Traffic Phase (with present traffic volume)	22-6
Table 22.2.4	Calculation Table of Traffic Phase (Do-nothing case in 2010).....	22-7
Table 22.2.5	Calculation Table of Traffic Phase (without bridge in 2020).....	22-8
Table 22.2.6	Calculation Table of Traffic Phase (grade separation in 2020).....	22-9
Table 22.2.7	Total Number of Buses at Azizbekov Intersection.....	22-9
Table 22.2.8	Bus Route Numbers Stopping at each Bus Stop.....	22-10
Table 22.2.9	Azizbekov Bus Route (Planning) Frequency	22-11
Table 22.2.10	Road Design Speed and Number of Lanes	22-15
Table 22.2.11	List of Geometric Structure Conditions.....	22-16
Table 22.2.12	Result of Geotechnical Soil Test	22-16
Table 22.2.13	List of Public Facilities.....	22-17
Table 22.2.14	Improvement Alternatives of Intersection	22-19
Table 22.2.15	Calculation of Station Plaza Area.....	22-22
Table 22.2.16	Comparison of Improvement Plans of the Station Square.....	22-23
Table 22.2.17	Azizbekov Intersection Improvement (comparison of options)	22-24
Table 22.3.1	Project Cost	22-37
Table 22.3.2	Benefits of the Improvement	22-38
Table 22.3.3	Economic Benefit.....	22-38
Table 22.3.4	Economic Cost	22-38
Table 22.3.5	Factors Affecting Environment with Implementation of Project	22-39
Table 22.3.6	Environmental Impacts by Azizbekov Improvement	22-42
Table 22.3.7	Recommended Measures for Mitigation of Environmental Impact	22-43

List of Figures

Figure 1.1.1	Location of the Planning Area.....	1-3
Figure 1.2.1	Work Flow.....	1-7
Figure 2.2.1	Industrial Production by Cities.....	2-5
Figure 2.2.2	Trend of Industrial Production	2-5
Figure 2.2.3	Industrial Production in the 11 Districts in Baku	2-7
Figure 2.3.1	Organization of the Central Government	2-10
Figure 2.3.2	Organization of Cabinet of Ministers	2-11
Figure 2.3.3	Organization of State Committee	2-13
Figure 2.3.4	Organization of Azeravtoyol	2-14
Figure 2.3.5	Organization of Azeravtonaglyyat	2-16
Figure 2.3.6	Organization of the Baku Executive Power	2-19
Figure 2.3.7	Organization of Department of Transport	2-21
Figure 2.3.8	Administration of Surface Public Transport.....	2-22
Figure 2.3.9	Organization of Bakinski Metropolitan.....	2-24
Figure 2.3.10	Organization of Bakgiprogor.....	2-25
Figure 3.1.1	General Plan of Baku	3-3
Figure 3.2.1	Present Urban Structure.....	3-5
Figure 3.2.2	Absheron Peninsular and Baku City.....	3-9
Figure 3.2.3	Present Land Use.....	3-12
Figure 4.1.1	Screen Line, Traffic Volume and Bus Terminal Survey Location	4-2
Figure 4.1.2	Cordon Line Survey Location	4-3
Figure 4.2.1	Gender Distribution of Samples Compared to Total Population.....	4-6
Figure 4.2.2	Age Group Distribution of Samples Compared to Total Population.....	4-6
Figure 4.2.3	Household Size Share of Sampled Households.....	4-7
Figure 4.2.4	Occupation Distribution of Sampled Population.....	4-10
Figure 4.2.5	Employment Sector Distribution of Employed Persons.....	4-10
Figure 4.2.6	Average Trip Rate by Gender in Several Cities	4-11
Figure 4.2.7	Average Trip Rate by Occupation.....	4-12
Figure 4.2.8	Average Trip Rate by Household Income	4-12
Figure 4.2.9	Average Trip Rate by Occupation.....	4-13
Figure 4.2.10	Trip Purpose Distribution.....	4-13
Figure 4.2.11	Trip Generation by Zone	4-14
Figure 4.2.12	Trip Purpose Composition by Zone.....	4-14
Figure 4.2.13	Number of Trips by Departure Time	4-16
Figure 4.2.14	Desired Line for All Travel Modes	4-17
Figure 4.2.15	Desired Line of Passenger Car Mode.....	4-17
Figure 4.2.16	Desired Line by Bus Mode.....	4-18
Figure 4.2.17	Desired Line by Rail Transport Mode.....	4-18
Figure 4.2.18	Modal Share	4-22
Figure 4.2.19	Comparison of Modal Share in Cities	4-23
Figure 4.2.20	Modal Share by Car Ownership	4-23
Figure 4.2.21	Modal Share by Zone	4-24
Figure 4.3.1	Temporal Passenger Loading Pattern of Subway at Survey Station	4-28

Figure 4.4.1	Trip Purpose by Type of Railway Passengers.....	4-30
Figure 4.4.2	Average Travel Times of Train Passengers.....	4-32
Figure 4.4.3	Train Passenger OD Distribution Pattern.....	4-32
Figure 4.5.1	Frequency of Buses by Types at Survey Locations.....	4-35
Figure 4.5.2	Frequency of Buses by Operation at Survey Locations.....	4-36
Figure 4.5.3	Type of Buses Used by Respondents.....	4-36
Figure 4.5.4	Trip Purpose of Respondents.....	4-37
Figure 4.7.1	Bus Transfer Area at 20 January.....	4-42
Figure 4.7.2	Taxi and Metro Transfer Area at January 20.....	4-42
Figure 4.7.3	Public Transport Transfer Area At 28 May.....	4-43
Figure 4.7.4	Total Bus Arrivals and Departures at The Squares.....	4-44
Figure 4.7.5	Total Bus Arrivals and Departures by Types at 28 May Square.....	4-45
Figure 4.7.6	Total Bus Arrivals and Departures by Types, by Areas at 20 Jan Square.....	4-46
Figure 4.7.7	Passengers Continue on Foot Versus Transfer at 28 May Square.....	4-48
Figure 4.7.8	Passengers Continue on Foot versus Transfer at 20 January Square.....	4-48
Figure 4.7.9	Parking Demand by Area at 20 January Square.....	4-57
Figure 4.7.10	Parking Demand by Area at 28 May Square.....	4-58
Figure 4.7.11	Temporal Distribution of Parking Demand at 20 January Square.....	4-61
Figure 4.7.12	Temporal Distribution of Parking Demand at 28 May Square.....	4-61
Figure 4.8.1	Parking Survey Area in CBD.....	4-62
Figure 4.8.2	Temporal Parking Demand Pattern in CBD area.....	4-63
Figure 5.1.1	The Road Network of Major Trunk Roads in Azerbaijan.....	5-3
Figure 5.2.1	Existing Road Network in Baku.....	5-12
Figure 5.2.2	The Result of the Road Inventory Survey (road condition).....	5-13
Figure 5.2.3	The Result of the Road Inventory Survey (one-way).....	5-14
Figure 5.2.4	The Result of the Road Inventory Survey (road width).....	5-15
Figure 5.2.5	The Result of the Road Inventory Survey (tree planting).....	5-16
Figure 5.2.6	The Result of the Road Inventory Survey (parking condition).....	5-17
Figure 5.2.7	The Result of the Road Inventory Survey (drainage condition).....	5-18
Figure 5.2.8	Existing Terminals.....	5-20
Figure 5.2.9	Road Development Plan in Middle Term.....	5-24
Figure 5.2.10	Existing and On-going Road Projects (port access).....	5-27
Figure 5.2.11	Existing and On-going Road Project.....	5-28
Figure 5.3.1	Temporal Traffic Pattern at Peripheral Radial Roads.....	5-34
Figure 5.3.2	Temporal Traffic Pattern at CBD Bound Trunk Roads.....	5-35
Figure 5.3.3	Temporal Traffic Pattern on City Center Roads.....	5-35
Figure 5.3.4	Traffic Composition at Traffic Survey Stations on Major Roads.....	5-36
Figure 5.3.5	Seasonal Changes of Traffic Volume at Selected Locations.....	5-37
Figure 5.3.6	Traffic Composition Across the Screen Line.....	5-38
Figure 5.3.7	Recommended Site Arrangement for the Conduct of the Cordon Line Interview Survey.....	5-39
Figure 5.3.8	Temporal Fluctuation of Traffic at 3 Cordon Survey Locations.....	5-41
Figure 5.3.9	Modal Share of Cordon Line Survey.....	5-42
Figure 5.3.10	Desired Line of Cordon Line Survey by Travel Mode.....	5-43
Figure 5.3.11	Travel Speed in the Morning Peak Period (Car).....	5-46
Figure 5.3.12	Travel Speed in the Morning Peak Period (Bus).....	5-47
Figure 5.3.13	Peak Hour Traffic by Direction at 20 January Square.....	5-50
Figure 5.3.14	Peak Hour Traffic at the Intersection of Beybutov St. and Fizuli St.....	5-53

Figure 5.3.15	Accident Occurrences by Time Span	5-55
Figure 5.3.16	Accident Occurrences by Route (1999).....	5-56
Figure 5.3.17	Accident Occurrences by Route (2000).....	5-56
Figure 5.3.18	Routes with Frequent Occurrence of Death Accidents (4 routes with the highest frequencies of accident occurrences).....	5-57
Figure 5.3.19	Points with Frequent Accident Occurrences by District (4 districts with the highest frequencies of accidents)	5-58
Figure 5.4.1	Parking Prohibition Area.....	5-61
Figure 5.4.2	Car Parking Survey Area and Number of On-street Parked Cars.....	5-64
Figure 5.5.1	Distribution of Cycles of Signals Installed.....	5-66
Figure 5.5.2	Signal Installation Conditions	5-68
Figure 5.5.3 (1)	One-Way System in Central Baku	5-70
Figure 5.5.3 (2)	One-Way System in the Central Baku.....	5-71
Figure 5.5.4	Vehicle Registration by District (31/October/2000).....	5-72
Figure 5.5.5	Restriction Area for Heavy Vehicles.....	5-75
Figure 6.2.1	Present Subway Network in the Baku City	6-3
Figure 6.2.2	Development of Subway Network (1976 – Present)	6-4
Figure 6.2.3	No. of Passengers Using the Baku Subway (1995-1999).....	6-5
Figure 6.2.4	Number of Passengers by Subway Station (1999)	6-7
Figure 6.2.5	Budget Trend of Baku Subway	6-9
Figure 6.3.2	Bus Operations by the Transport Department	6-14
Figure 6.3.1	Bus Network by Transport Department.....	6-16
Figure 6.3.3	Bus Network (Privately-operated Buses)	6-17
Figure 6.3.4	Tram and Trolley Bus Network.....	6-18
Figure 6.3.5	Modal Share in Public Transport.....	6-20
Figure 6.5.1	Railway Network of Suburban Lines	6-26
Figure 6.6.1	Passenger Traffic at the Baku Airport	6-27
Figure 6.7.1	Layout of the 20 January Square	6-31
Figure 6.7.2	Traffic Movement Pattern of Buses Arriving/Departing at Bus Stops No.2 and No.4 in the 20 January Square.....	6-33
Figure 6.7.3	Traffic Movement Pattern of Buses Arriving/Departing at Bus Stops No.5 and No.6 & 9 in the 20 January Square.....	6-34
Figure 6.7.4	Traffic Movement Pattern of Buses Arriving/Departing at Bus Stop No.8 in the 20 January Square	6-35
Figure 6.7.5	Layout of the 28 May Square	6-36
Figure 6.9.1	Network Coordination (subway – tram – trolley bus).....	6-40
Figure 7.1.1	Existing Problem of Public Transport Network	7-2
Figure 7.1.2	Transportation Problems of Road.....	7-3
Figure 7.1.3	The Problems of Road Traffic and Network	7-4
Figure 7.1.4	Problems From the Viewpoint of Traffic Management	7-5
Figure 7.1.5	Transport Problem Structure	7-6
Figure 7.1.6	Transport Problem and Background.....	7-7
Figure 7.2.1	Issues of Public Transport Network	7-13
Figure 7.2.2	Transportation Issues of Roads	7-14
Figure 7.2.3	Transportation Issues of Road Traffic	7-15
Figure 7.2.4	Issues of Traffic Management	7-16

Figure 8.3.1	Car Ownership by Household Income.....	8-7
Figure 9.3.1	Present Land Use.....	9-6
Figure 9.3.2	Present Urban Structure.....	9-7
Figure 9.3.3	Future Urban Structure Alt.I.....	9-8
Figure 9.3.4	Future Urban Structure Alt.II	9-9
Figure 9.3.5	Proposed Urban Structure.....	9-10
Figure 9.3.6	Future Land Use	9-11
Figure 10.2.1	Trip Rate by Household Income by Car Ownership	10-2
Figure 10.3.1	Population by Zone in year 2000 and 2020	10-6
Figure 10.3.2	Worker by Working Place Zone in year 2000 and 2020	10-6
Figure 10.3.3	Trip Generation by Zone in year 2000 and 2020.....	10-7
Figure 10.4.1	Trip Length Distribution in year 2000 and 2020.....	10-11
Figure 10.4.2	Trip Distribution Pattern in 2000 (spider network assignment)	10-12
Figure 10.4.3	Trip Distribution Pattern in 2020 -Do-Nothing Case (spider network assignment)	10-12
Figure 10.5.1	Structure of Model Split Model.....	10-13
Figure 10.5.2	Walking Split Model	10-14
Figure 10.5.3	Car-Public Split Model.....	10-17
Figure 10.5.4	Rail-Bus Split Model.....	10-17
Figure 10.7.1	Volume Delay Function	10-19
Figure 10.7.2	Car Assignment Result in 2000.....	10-21
Figure 10.7.3	Car Assignment Result in 2020 (Do-nothing Case)	10-21
Figure 10.7.4	Bus Assignment Result in 2000	10-22
Figure 10.7.5	Bus Assignment Result in 2020 (Do-nothing Case).....	10-22
Figure 10.7.6	Rail Mode Assignment Result in 2000.....	10-23
Figure 10.7.7	Rail Mode Assignment Result in 2020 (Do-nothing Case).....	10-23
Figure 10.7.8	Road Congestion Rate Result in 2000.....	10-24
Figure 10.7.9	Road Congestion Rate Result in 2020 (Do-nothing Case)	10-24
Figure 10.8.1	Trip Distribution Pattern in 2010 (spider network assignment)	10-25
Figure 10.8.2	Car Assignment Result in 2010 (Do-nothing case)	10-26
Figure 10.8.3	Bus Assignment Result in 2010 (Do-nothing case).....	10-26
Figure 10.8.4	Rail Mode Assignment Result in 2010 (Do-nothing case).....	10-27
Figure 10.8.5	Road Congestion Rate in 2010 (Do-nothing case)	10-27
Figure 11.2.1	Planning Concept for Public Transportation System.....	11-7
Figure 11.2.2	Public Transport Concept in the Central Area of Baku	11-9
Figure 11.2.3	Concept for Terminal Arrangement	11-11
Figure 11.2.4	The Great Silk Road Corridor	11-12
Figure 11.2.5	Assumable Great Silk Roads	11-12
Figure 11.2.6	Regional Road Network in Apsheron Peninsula	11-13
Figure 11.2.7	Three Corridors Concentrating to Baku City	11-14
Figure 11.2.8	Concept of the East-West Corridor	11-14
Figure 11.2.9	Circulating Routes in Baku	11-15
Figure 11.2.10	Basic Structure of the Future Road Network.....	11-17
Figure 11.2.11	Conceptual Illustration of Arterial Roads in Grid Pattern	11-18
Figure 11.2.12	Concept of Road Network System in the Central Area of Baku	11-19
Figure 11.2.13	Traffic Management Concept in the Center of the City	11-21

Figure 12.1.1	Capacity Check Sections	12-2
Figure 12.1.2	Parking Demand 2000/2020 in CBD (PT Zone-2,8,9, and 10)	12-4
Figure 12.1.3	Sections for Bus Capacity Analysis	12-6
Figure 12.3.1	Possible Investment Frame in Transport Sector in Baku.....	12-16
Figure 12.4.1	Concept-Oriented Road Network	12-22
Figure 12.4.2	Restrained Road Network.....	12-23
Figure 12.4.3	Alternatives in Public Transport Sector (1).....	12-25
Figure 12.4.4	Alternatives in Public Transport Sector (2).....	12-26
Figure 12.5.1	EIRRs of Alternatives	12-31
Figure 12.5.2	40 minutes Coverage Area by Public Transport (Bus, Rail Transit) in 2020 (Do-nothing Case).....	12-34
Figure 12.5.3	40 minutes Coverage Area by Public Transport (Bus, Rail Transit) in 2020 (Case G, GG)	12-34
Figure 12.5.4	Comparison of CO Emission Amount by Alternative	12-38
Figure 12.5.5	Comparison of NOx Emission Amount by Alternative.....	12-39
Figure 12.5.6	Comparison of CO2 Emission Amount by Alternative	12-39
Figure 12.6.1	Urban Transport Improvement Plan	12-43
Figure 13.2.1	Master Plan Road Network	13-4
Figure 13.2.2	Road Network Plan by Number of Lane	13-5
Figure 13.2.3	Future Traffic Volume on the Proposed Road Network.....	13-6
Figure 13.2.4	Road Congestion Rate in Master Plan Road Network in 2020.....	13-7
Figure 13.2.5	Typical Cross Section.....	13-11
Figure 13.2.6	Connecting Parks of Linear Type.....	13-12
Figure 13.2.7	Pedestrian Network	13-14
Figure 13.2.8	Location of the Intersection Improvement Investigation.....	13-21
Figure 13.2.9	Traffic Volume of the Intersection in 2020 (Master Plan Network)	13-22
Figure 13.2.10	Milling Machine	13-30
Figure 13.2.11	Planning Approach of Road Maintenance.....	13-32
Figure 13.2.12	Average Roughness Weighed by Length for Each Alternative	13-37
Figure 13.2.13	Road Rehabilitation Plan.....	13-39
Figure 13.2.14	Selected Pedestrian Passage Locations.....	13-41
Figure 13.3.1	Improvement Plans for One-Way System.....	13-50
Figure 13.3.2	Central Business District	13-53
Figure 13.3.3	Signal Installation Conditions	13-65
Figure 13.3.4	Route for Synchronization of Traffic Signals.....	13-67
Figure 13.3.5	Area Traffic Control System	13-70
Figure 13.3.6	Safety Measure (road illuminations and guardrails).....	13-72
Figure 13.3.7	Underpasses in the Central Area (CBD).....	13-73
Figure 13.3.8	Concept of the ITS (Intelligent Transport System)'s Function	13-74
Figure 13.3.9	Block Diagram of Traffic Control System	13-76
Figure 13.3.10	Parking Lot Guidance System	13-77
Figure 13.3.11	Image of Public Transportation Priority System	13-78
Figure 13.4.1	Street Environment Improvement and Traffic Management Plan in the Central Area	13-81
Figure 13.4.2	Conceptual Illustration of the Cargo Distribution System	13-84
Figure 13.4.3	Proposed Truck Terminal Location.....	13-85
Figure 13.4.4	Truck Terminal Plan.....	13-86

Figure 13.5.1	Road Project Location Map.....	13-87
Figure 13.5.1	Road Project Location Map.....	13-88
Figure 14.2.1	Future Expansion Plan of Subway Network.....	14-6
Figure 14.2.2	Suburban Railway and Passenger Demand in 2020 (100 pax./day)	14-8
Figure 14.2.3	Candidate Location of LRT (Light Rail Transit) in the Central Area	14-10
Figure 14.2.4	Existing Tram Routes to be Renovated and Trolley bus Routes	14-13
Figure 14.2.5	Classification of Bus Route Patterns	14-16
Figure 14.2.6	Trunk Bus Network Plan	14-20
Figure 14.2.7	Improvement Direction of 28 May Square.....	14-27
Figure 14.2.8	Proposed New Bus Terminal Locations	14-28
Figure 14.2.9	Existing Bus Terminal Locations	14-34
Figure 16.3.1	IEE Procedure.....	16-12
Figure 16.3.2	Main Area to be Examined for Environmental Impact	16-18
Figure 16.3.3	Cooperation for Air Pollution Control in Baku City	16-22
Figure 16.4.1	General Procedure for Implementation Program.....	16-25
Figure 16.4.2	Implementation Program.....	16-26
Figure 16.4.3	Process of the Priority Project Selection	16-29
Figure 17.2.1	Flow Chart for Planning Large-Size Bus Introduction.....	17-7
Figure 17.2.2	Priority Trunk Bus Route (No.101).....	17-9
Figure 17.2.3	Priority Trunk Bus Route (No.98).....	17-10
Figure 17.2.4	Example of Bus Fleet	17-12
Figure 17.2.5 (1)	Trunk and Feeder Service System (Alternative I)	17-16
Figure 17.2.5 (2)	Trunk and Feeder Service System (Alternative II).....	17-17
Figure 17.3.1	Emission Amount of Air Pollutants.....	17-31
Figure 17.3.2	Estimated Emission Amount of Air Pollutant	17-32
Figure 18.1.1	The Location of Bottleneck Caused by Minibus	18-1
Figure 18.2.1	Flow of Selection of Bottlenecks	18-3
Figure 18.2.2	Location of Bottleneck Project Candidates	18-4
Figure 18.2.3	Location of Identified Bottlenecks to be Improved.....	18-7
Figure 18.2.4	Daily Traffic Volumes at Bottleneck Intersections	18-8
Figure 18.2.5	The Location Map	18-9
Figure 18.2.6	Plan of Sarakina St. Reconstruction	18-12
Figure 18.2.7	Profile of Sarakina St. Reconstruction	18-13
Figure 18.2.8	Cross Section of Sarakina St. Reconstruction	18-14
Figure 18.2.9	Location of Public Facilities of Samad Vulgan Widening	18-17
Figure 18.2.10	Location of Samad Vulgan Widening	18-18
Figure 18.2.11	Plan of Samad Vurgan Widening.....	18-19
Figure 18.2.12	Profile of Samad Vulgan Widening.....	18-20
Figure 18.2.13	Typical Cross Section.....	18-21
Figure 18.2.14	Location of Public Facilities of Ingillab - Moskva.....	18-25
Figure 18.2.15	Location of Project Roads of Ingillab - Moskva	18-26
Figure 18.2.16 (1)	Plan of Middle Ring Road (1/3) of Ingillab - Moskva	18-27
Figure 18.2.16 (2)	Plan of Middle Ring Road (2/3) of Ingillab - Moskva	18-28
Figure 18.2.16 (3)	Plan of Middle Ring Road (3/3) of Ingillab - Moskva	18-29
Figure 18.2.17	Profile of Middle Ring Road of Ingillab - Moskva	18-30

Figure 18.2.18	Typical Cross Section of Middle Ring Road of Ingillab - Moskva	18-31
Figure 18.2.19	Location of Public Facilities of Intersection of Tbilisi and Salamzadeh	18-35
Figure 18.2.20	Plan of Intersection (Intersection of Tbilisi and Salamzadeh).....	18-36
Figure 18.2.21	Profile of Tbilisi Ave. of Intersection of Tbilisi and Salamzadeh	18-37
Figure 18.2.22	Typical Cross Section (Intersection of Tbilisi and Salamzadeh).....	18-38
Figure 18.2.23	Location of Public Facility of Ziya Bunyadov and Azadlig	18-42
Figure 18.2.24	Plan of Intersection of Ziya Bunyadov and Azadlig	18-43
Figure 18.2.25	Profile of Intersection of Ziya Bunyadov	18-44
Figure 18.2.26	Typical Cross Section of Ziya Bunyadov and Azadlig	18-45
Figure 18.2.27	General View of Azadlig Bridge.....	18-46
Figure 18.2.28	Cross Section of Azadlig Bridge	18-47
Figure 18.3.1	Proposed Procedure for Implementation of People Relocation.....	18-55
Figure 19.1.1	Location of Existing Tramlines	19-2
Figure 19.1.2	Tram Line Route (existing)	19-3
Figure 19.2.1	Tram Rehabilitation Line	19-5
Figure 19.2.2	Organization Chart for Tram Depot of Transport Department.....	19-7
Figure 20.1.1	Travel Speed in the Central Area of Baku City (Car)	20-2
Figure 20.1.2	Parking Demand and Capacity in Urban Area (4 Zones in the PT Survey)	20-10
Figure 20.1.3	Candidate Locations of Fringe Parking Lots in Urban Area in 2020	20-11
Figure 20.1.4	Main Schemes in Connection to Objectives.....	20-14
Figure 20.2.1	Central Traffic Control (Central Signal Control) Coverage Area	20-16
Figure 20.2.2	Block Diagram of Central Traffic Control System.....	20-17
Figure 20.2.3	Control Segments and Sub Area in The Central Traffic Control Area.....	20-18
Figure 20.2.4	Function and Facility of Central Control System (Centralized Signal Control System)	20-19
Figure 20.2.5	Vehicle Detector Installation Plan.....	20-20
Figure 20.2.6	Traffic Signal Installation.....	20-21
Figure 20.2.7	Location of Monitoring Equipment (CCTV).....	20-22
Figure 20.2.8	Basic Determination of the Signal Parameter.....	20-24
Figure 20.2.9	The Central Traffic Control Area by Phase.....	20-25
Figure 20.2.10	Implementation Schedule of Central Traffic Control System	20-26
Figure 21.1.1	Location Map	21-1
Figure 21.1.2	Memorial Monument at 20 January Square	21-1
Figure 21.2.3	Standard Road Width Configuration	21-12
Figure 21.2.4	Standard Sizes of Buses.....	21-14
Figure 21.2.5	Specifications of Bus Stop.....	21-15
Figure 21.2.6	Location of Public Facilities of 20 January Intersection	21-17
Figure 21.2.7	Rearrangement of Inter-city and International Bus Route.....	21-21
Figure 21.2.8	Plan of Northern Intersection Improvement.....	21-22
Figure 21.2.9	Comparison of Tram Route.....	21-23
Figure 21.2.10	Image of Facilities Arrangement Improvement Plan.....	21-27
Figure 21.2.11 (1)	Plan of 20 January Intersection Improvement	21-28
Figure 21.2.11 (2)	Plan of 20 January Intersection Improvement.....	21-29
Figure 21.2.11 (3)	Plan of 20 January Intersection Improvement.....	21-30
Figure 21.2.12	Plan of Southern Intersection Improvement.....	21-31
Figure 21.2.13	Profile of Tbilisi Ave.....	21-32

Figure 21.2.14	Typical Cross Section.....	21-33
Figure 22.1.1	Location Map	22-1
Figure 22.1.2	Problems of the Intersection.....	22-3
Figure 22.2.1	Directional Traffic Volume in 2001	22-4
Figure 22.2.2	Directional Traffic Volume in 2010 and 2020	22-5
Figure 22.2.3	Bus Routes.....	22-12
Figure 22.2.4	Proposed Location of Bus Stop	22-13
Figure 22.2.5	Standard Road Width Configuration	22-15
Figure 22.2.6	Location of Public Facilities and Factory.....	22-18
Figure 22.2.7	Profile of Gara Garayev St. Extension	22-20
Figure 22.2.8	Comparison of Grade Separation of Moskva Ave.....	22-21
Figure 22.2.9 (1)	Plan of Azizbekov Intersection Improvement	22-27
Figure 22.2.9 (2)	Plan of Azizbekov Intersection Improvement	22-28
Figure 22.2.9 (3)	Plan of Azizbekov Intersection Improvement	22-29
Figure 22.2.10	Plan of East Terminal	22-30
Figure 22.2.11	Profile of Moskva Ave.	22-31
Figure 22.2.12	Profile of East Terminal	22-32
Figure 22.2.13	Profile of Mikayl Aliyev Ave.....	22-33
Figure 22.2.14	Typical Cross Section.....	22-34
Figure 22.2.15	General View of Azizbekov Bridge	22-35
Figure 22.2.16	Cross-section of Bridge	22-36

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.)