JAPAN INTERNATIONAL COOPERATION AGENCY
MINISTRY OF INFRASTRUCTURE DEVELOPMENT
TRANSPORT DEPARTMENT OF ULAAN BAATAR CITY
MONGOLIA

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR IMPROVEMENT OF PUBLIC TRANSPORTATION IN ULAAN BAATAR IN MONGOLIA

MARCH 1995

YACHIYO ENGINEERING CO., LTD.
KATAHIRA & ENGINEERS INTERNATIONAL

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PREFACE

In response to a request from the Government of Mongolia, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Public Transportation in Ulaan Baatar and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Mongolia a study team headed by Mr. Masao Takai, Director of Second Basic Design Study Division, Grant Aid Study and Design Department, and constituted by members of Yachiyo Engineering Co., Ltd. and Katahira & Engineers International, from September 27th to October 26th, 1994.

The team held discussions with the officials concerned of the Government of Mongolia, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Mongolia in order to discuss the draft report, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the Project 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 Mongolia for their close cooperation extended to the teams.

March, 1995

Kimio Fujita

President
Japan International Cooperation Agency

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

March, 1995

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Public Transportation in Ulaan Baatar in Mongolia.

This study was conducted by Yachiyo Engineering Co., Ltd. and Katahira & Engineers International, under a contract to JICA, during the period from September 16, 1994 to March 31, 1995. In conducting the study, we have examined the feasibility and rationale of the Project with due consideration to the present situation of Mongolia and formulated the most appropriate basic design for the Project under Japan's grant aid scheme.

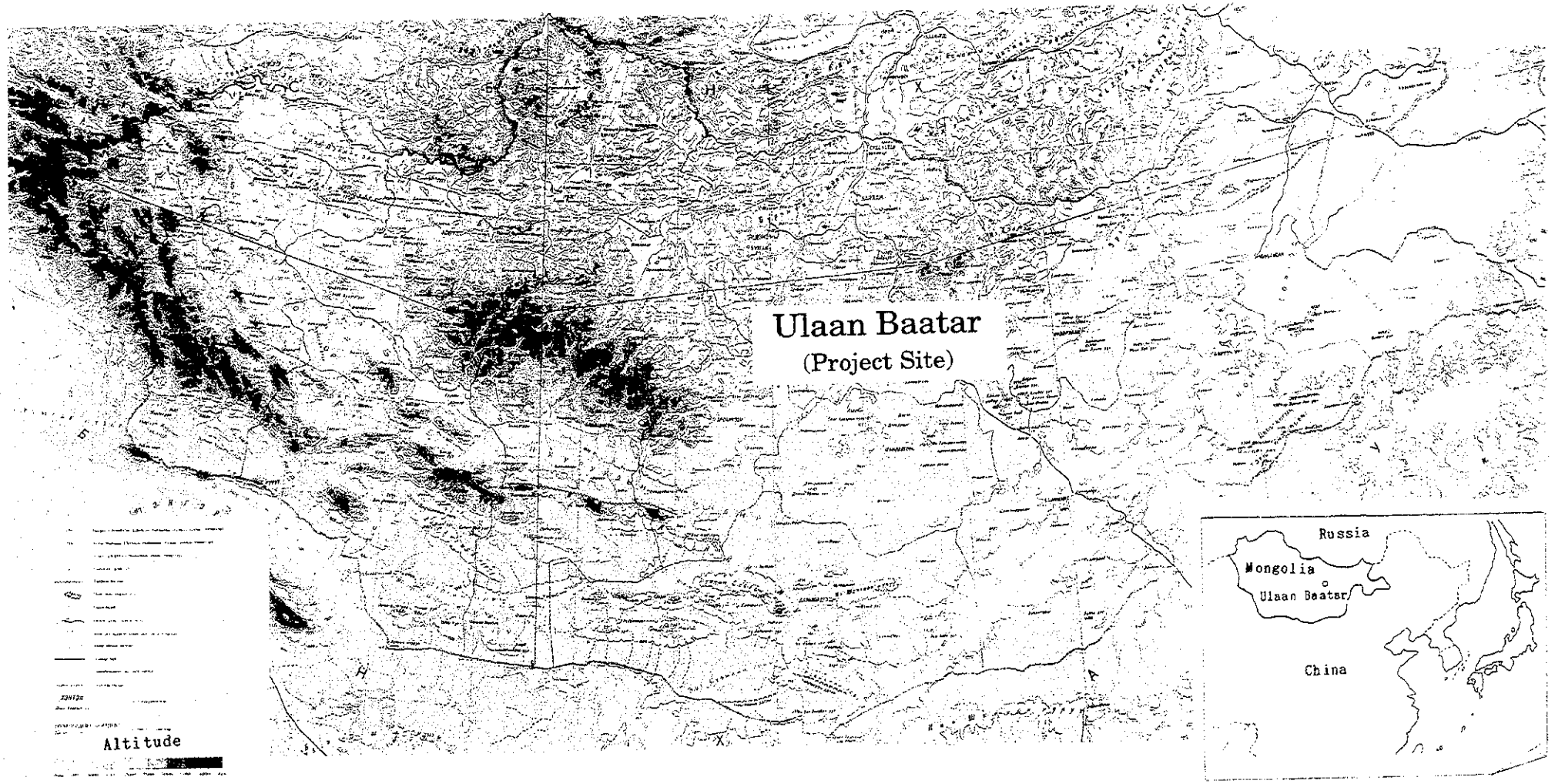
We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, and the Sapporo Municipal Authority. We would also like to express our gratitude to the officials concerned of the Ministry of Trade and Industry, the Ministry of Infrastructure Development, the Transport Department of the Ulaan Baatar city, the JOCV Mongolian Office and the Embassy of Japan in Mongolia for their cooperation and assistance throughout our field survey.

Finally, we hope that this report will contribute to the further promotion of the project.

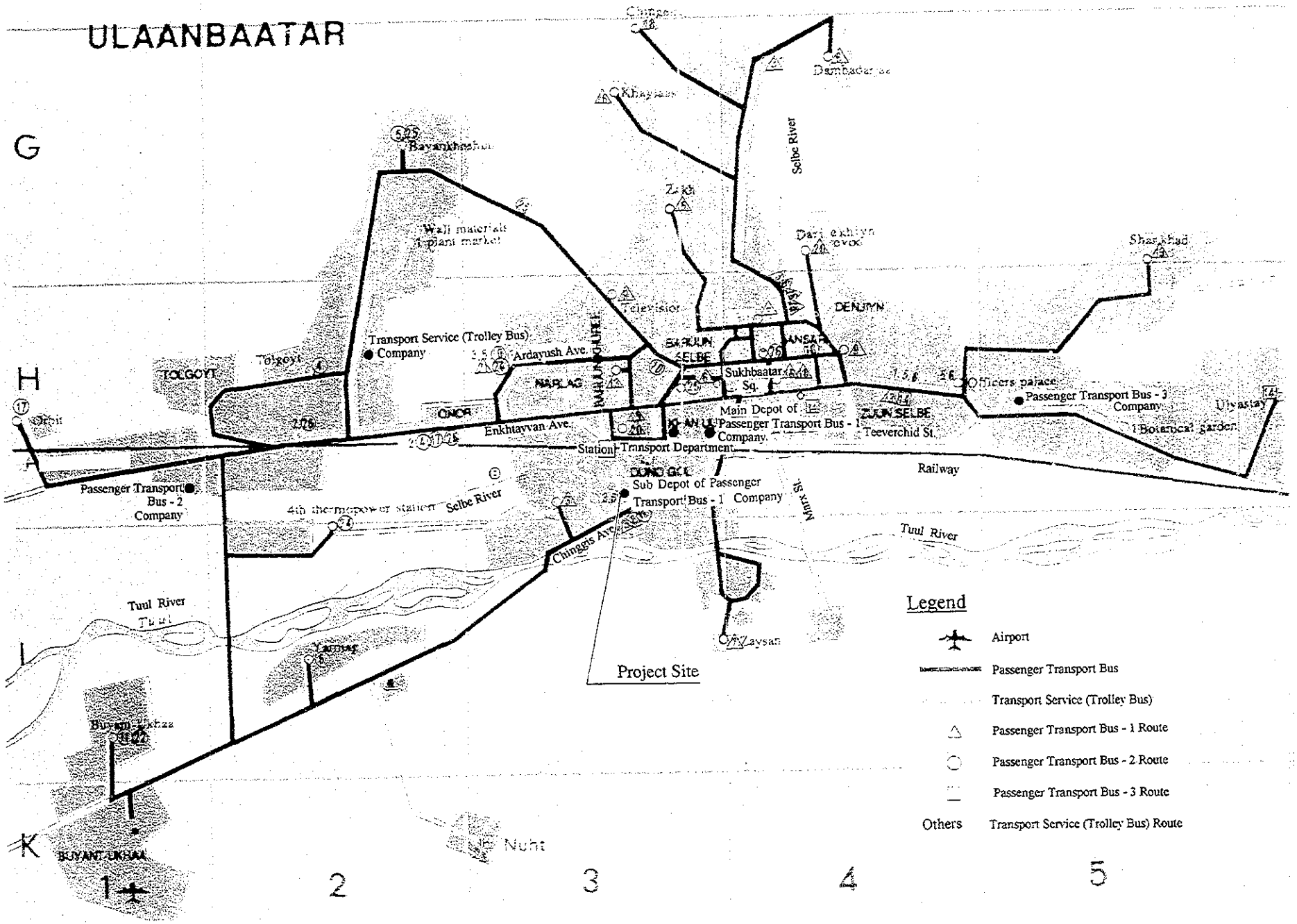
Very truly yours,

川村哲夫

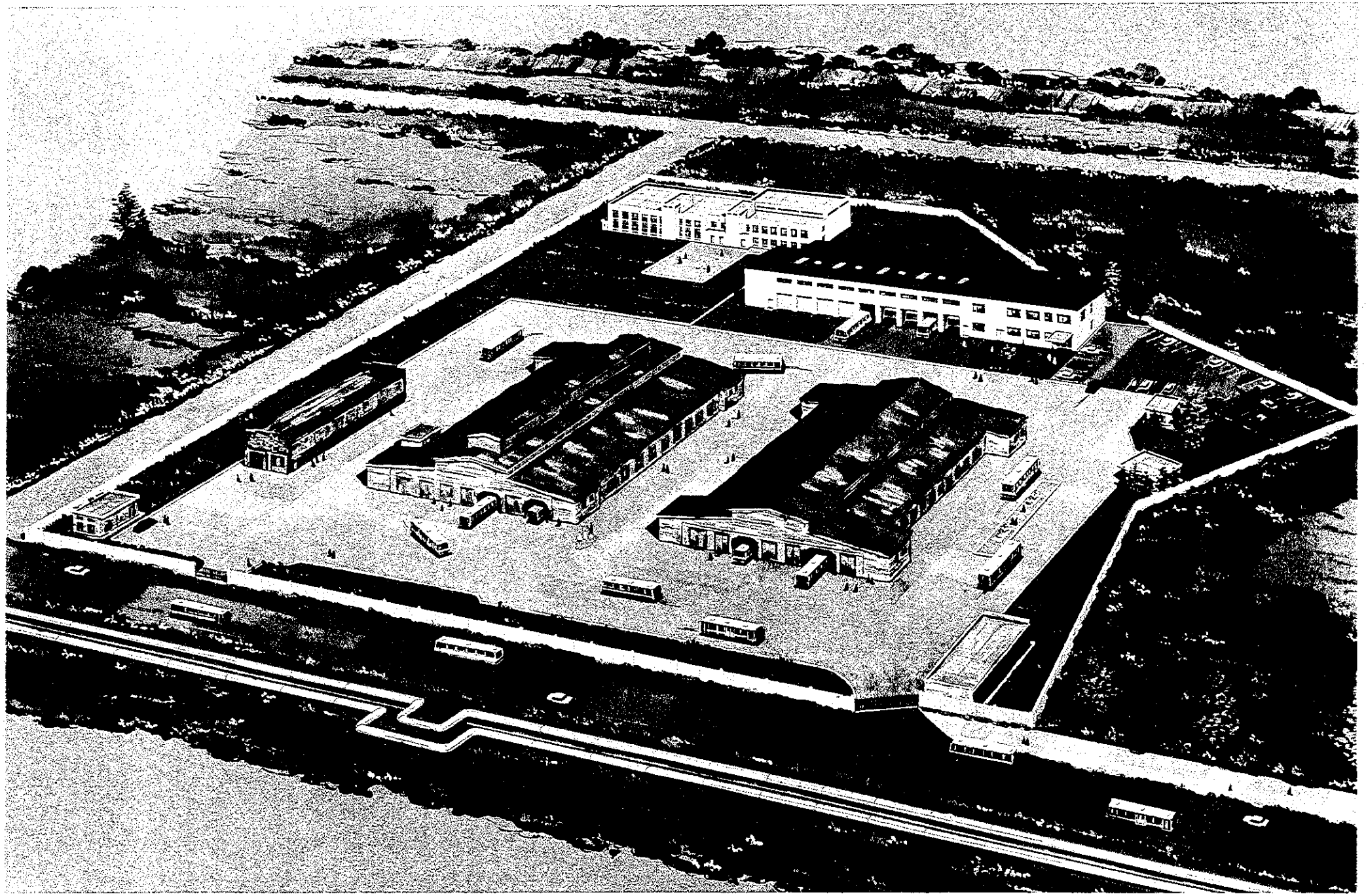
Tetsuo Kawamura
Project Manager
Basic Design Study Team on the Project for Improvement
of Public Transportation in Ulaan Baatar
Yachiyo Engineering Co., Ltd.
Katahira & Engineers International



MAP OF MONGOLIA

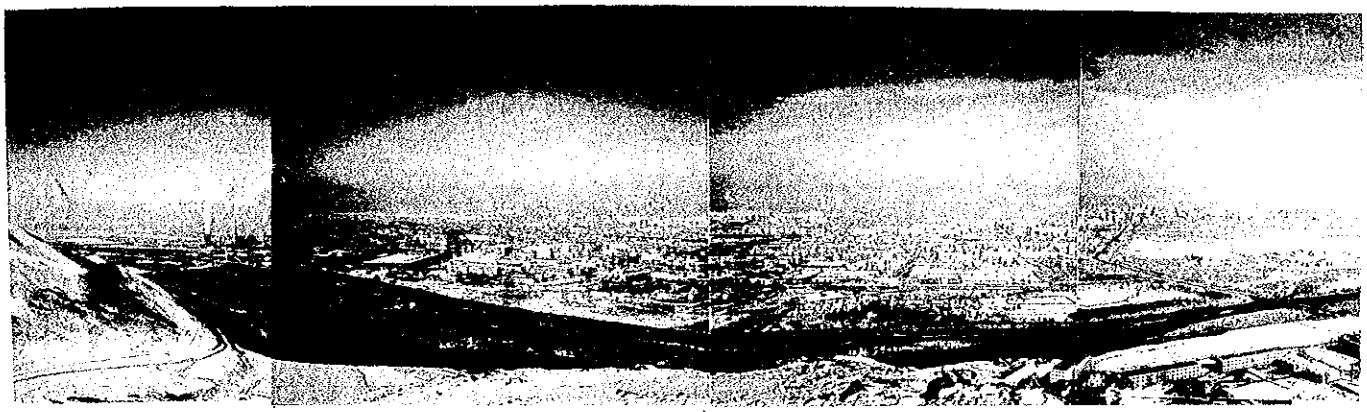


MAP OF PROJECT SITE IN ULAAN BAATAR



The Project for Improvement of Public Transportation in Ulaan Baatar in Mongolia

Overall View of Ulaan Baatar



The rapid change in the social and economic situation has effected the public transportation system of Ulaan Baatar (population of some 630,000).

With an operational efficiency rate of some 62 buses in the morning and evening rushes experience loads of up to 240% of capacity.

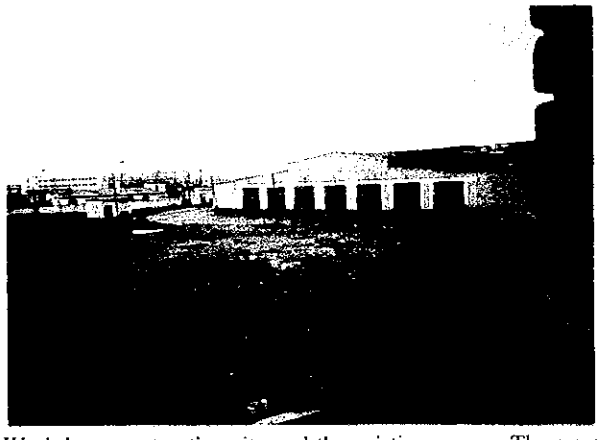
The long waiting time between buses due to the lack of buses, is effecting daily life and economic activity in the city.

Collection of fares on the bus. The actual collection rate is only 61%.

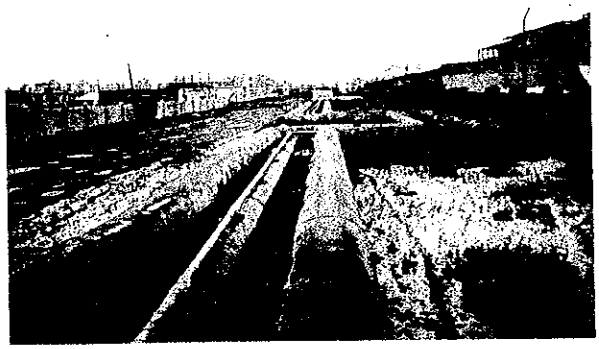
As the average winter temperature drops to –20°C, the lack of buses adds to the distress of the population.

Project Site of New Workshop Construction
(Sub-Depot of the Passenger Transport Bus-1 Company)

The Project site (approximately 4 ha) is located within the sub-depot of the Passenger Transport Bus-1 Company, where sufficient space is available. The building in the back is the welfare facility.



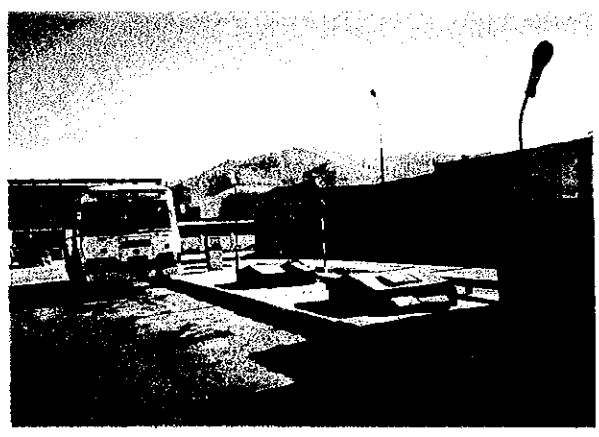
Workshop construction site and the existing garage. There are two garages with a capacity of 60 buses each. Buses provided in the Project will be stored in these garages.



The pipes of the local hot water heating system and industrial steam system which run along the entrance road to the Project site.

The existing car washing building. The Project will renovate the car washing facilities utilizing the existing building.

Existing lubrication facility. The outside fixture reduces work efficiency during the winter.



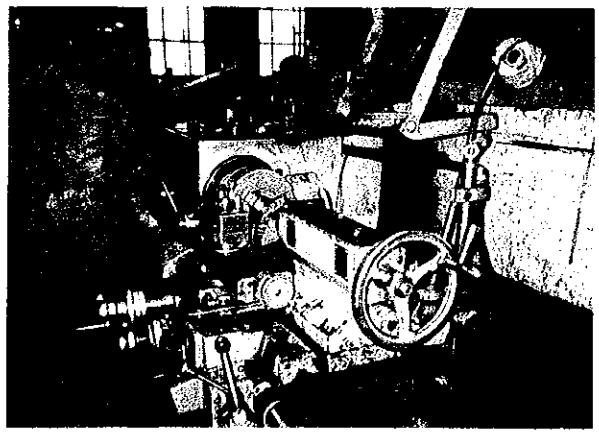
Existing fuel stand. These stand will be used by the Project.

Current State of the Passenger Transport Bus Companies in Ulaan Baatar

Main Depot of the Passenger Transport Bus-1 Company. As of Oct. 1994, it has 120 buses, and the largest employer (991) among the bus companies, excluding the trolley company.

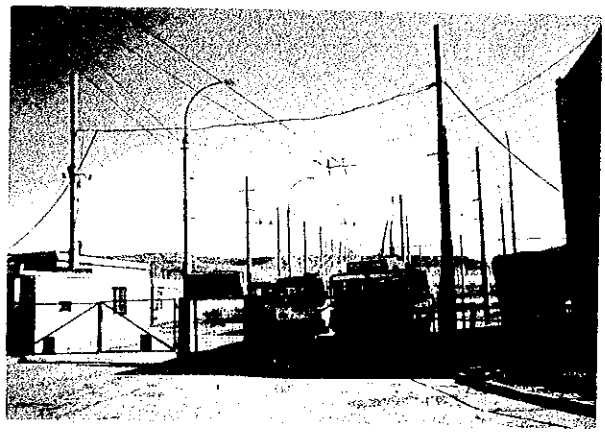
The repair and maintenance equipment of the Passenger Transport Bus-1 Company, are all procured between 1954 and 1982 and due to aging approximately 55% of the equipment are not fully functional.

Depot of the Passenger Transport Bus-2 Company. With some 5.2ha, it has the largest area among bus companies, and with 130 buses (October., 1994), it also has the most buses.



The workshop of the Passenger Transport Bus-2 Company. Although the largest among bus companies, some 55% of the machinery procured in 1987 are not fully functional.

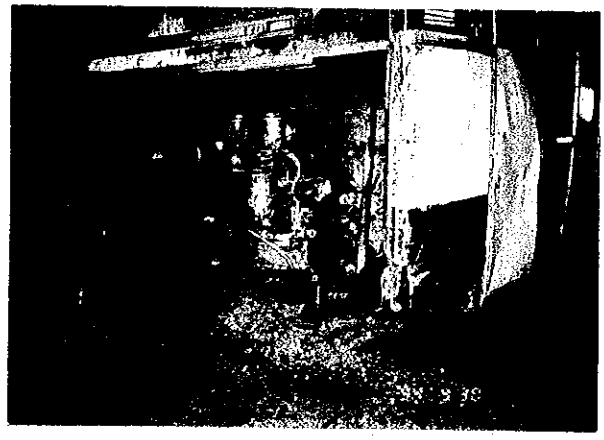
Depot of the Passenger Transport Bus-3 Company (Established in December 1992). The company's main operations are for charters, with only 2 regular bus routes (as of October. 1994).



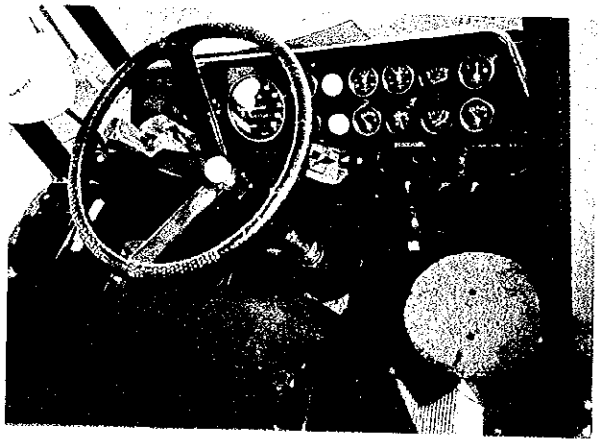
The trolley bus company. There are 154 trolley buses running on 8 routes (as of October 1994). The company has a special contract with the power station, however, there are frequent stoppages by power outages.

State of Buses Operated by the Passenger Transport Bus Companies of Ulaan Baatar

Russian made buses. The front gasoline engine causes high fuel cost and in convenient maintenance works in the frequent breakdown.

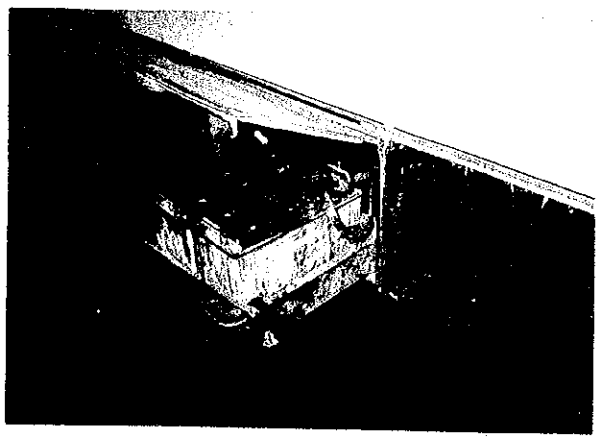


A Czechoslovakian bus. Rear mounted diesel engine. The clutch and transmission are too weak for the engine output resulting in frequent breakdowns.



Driver's seat of a Czechoslovakian bus. The solenoid valve switch-over type gear shift is prone to breakdown.

Repair of tires punctuation. There is tire re-treading facility in Ulaan Baatar, however the excess loss of wear and tear of tires makes retreading difficult.



Large capacity batteries are used to cope with the drop in capacity from extreme cold, in winter.

Repairing a Czechoslovakian bus. Having three doors facilitates boarding alighting, however, the frame structure is weak and fractures often occur in rear areas of the frame.

SUMMARY

SUMMARY

Mongolia is a vast inland country of some 1.656 million km^2 of land, bordering Russia and China. With a population of some 2.25 million (1993), its population density is as low as 1.44 persons/km^2. The average elevation is 1,580m and Ulaan Baatar, the capital of Mongolia (population of some 600,000 as of 1993), is located 1,325m above sea level. Mongolia formerly belonged to the COMECON and strived for nation-building with the assistance of the former Soviet Union and East European countries. It subsequently achieved liberalization by adopting a reformist line after Perestroika in the Soviet Union. Since 1990, however, the sudden stoppage of capital inflow from the former Soviet Union and COMECON countries, the disintegration of the political system and the domestic confusion regarding the introduction of a market economy have resulted in continual negative growth of the real GDP which recorded -9.9% in 1991, followed by -7.6% in 1992.

In order to overcome the economic crisis, Mongolia has prepared the Three-Year Economic Development Plan (1993-1995), featuring the rehabilitation and improvement of infrastructure, the efficient use of domestic capital and human resources and the rationalisation/development of production sectors, etc., in order to radically reform the domestic economy while seeking urgent assistance from Japan and other Western countries.

The economic difficulties are reflected on the public bus services in Ulaan Baatar which is the only form of public transport in the capital in that the renewal of the deteriorated bus fleet and maintenance/repair equipment and the procurement of spare parts are almost impossible due to the lack of funds. In addition, the increased oil price has widened the gap between the operation cost and revenue, disrupting the proper management and operation of bus services.

Passenger Transport Bus Company of Ulaan Baatar City was established in 1959 and has now been divided into 4 companies which are run on the basis of a self-supported accounting system with total employees of 3,169 as of 1994. In 1994, a private enterprise was given permission to operate bus services in Ulaan Baatar, bringing the total number of bus operators in the city to 5 with 30 routes.

At present, the total number of buses in Ulaan Baatar is 460, of which 452 (approximately 98%) are owned by the 4 Passenger Transport Bus Companies and 8 are owned by the private carrier. However the only 281 buses of the 452 publicly owned buses (62%) are in a serviceable condition and this number falls far short of the estimated 618 buses (1994) required to provide reasonable public bus transport services in Ulaan Baatar.

The shortage of operable buses has resulted in a high average congestion ratio of 170-180% for all routes which climbs to 200% during the morning and evening rush hours, creating a state of extreme congestion. Given the noticeable deterioration of the equipment and buildings of the existing workshops of the Passenger Transport Bus Companies with almost 55% of the repair equipment out of order, these workshops cannot properly perform their functions to ensure appropriate bus services, thus disrupting civic life and economic activities in the capital.

In order to improve the situation, the Government of Mongolia requested the Government of Japan provision of grant aid for a project for improvement of public transportation in Ulaan Baatar (hereinafter referred to as the Project). In response to this request, the Government of Japan instructed JICA to send the Preliminary Study Team to Mongolia for the period from June 16th to July 5th, 1994 to examine the scope of the required cooperation.

Following confirmation of the suitability and scope of Japanese assistance for the Project by the Preliminary Study Team, the Government of Japan then decided to conduct a basic design study on the items requested by Mongolian side, i.e. (i) procurement of new large buses, (ii) procurement of repair and maintenance equipment for a workshop and (iii) improvement of the facilities required for the sound operation and maintenance of these buses. On the instruction of the Government of Japan, JICA sent a Basic Design Study Team to Mongolia for the period from September 27th to October 26th, 1994. The same study team was sent to Mongolia again from January 8th to January 15th, 1995 to explain the contents of the Draft Final Report.

Through a series of consultations with the Mongolian side and field surveys, the Basic Design Study Team has established a firm understanding of the urgent necessity to improve public transportation in Ulaan Baatar while confirming the fact that the low bus service level in Ulaan Baatar, particularly in winter when the average temperature drops below -20°C, causes unbearable pain on the part of the public and severely disrupts civic life as well as industrial activities in Ulaan Baatar.

The Project is in line with such transport sector policies as the renewal of passenger buses and the construction of workshops to improve the bus service level, etc., called for by the Three-Year Economic Development Plan (1993-1995) which is the latest national development plan in Mongolia. In addition, even if the procurement of new public transport buses (60 buses) in Ulaan Baatar envisaged by the Transport Rehabilitation Project assisted by the World Bank is completed, there will still be a large gap between the passenger demand level and the transport capacity, resulting in failure to meet the target level for passenger transport of 1,500 passengers/bus/day and necessitating the further procurement of buses. The practical

impossibility of the Government of Mongolia to proceed with such additional procurement due to the shortage of funds underlines the urgency of the Project.

With regard to the components of the request, it has been confirmed that (i) the provision of new buses is necessary to urgently increase the transport capacity in order to ease the current chronic congestion and that (ii) the provision of repair and maintenance equipment, and (iii) improvement of facilities are also necessary for the proper operation and maintenance of the new buses to be provided. All these components are judged to work in an integral manner to raise the level of the positive effects of the Project.

Among the components, procurement of the repair and maintenance equipment and improvement of facilities will be conducted as an integral component of a workshop construction plan which envisages the construction of a new workshop at the sub-depot of Passenger Transport Bus - 1 Company. The new buses to be provided under the Project will be assigned to Passenger Transport Bus - 1 Company and will be kept in the existing garage of its sub-depot, making it possible to establish an efficient operation and maintenance system to conduct the maintenance and repair of the new buses on the same premises.

It has been decided that the Project will be implemented in 3 phases. Phase I will comprise the procurement of new buses to urgently ease the current congestion of the public bus services. Phase II will comprise the construction of a workshop required to ensure the sound operation and maintenance of the new buses to be provided in Phase I while Phase III will comprise the procurement of additional buses based on confirmation of the proper working of the bus maintenance system operated by the Mongolian side.

Outline of Facilities and Equipment of the Project

	Phase I	Phase II	Phase III
Equipment Procure-ment Plan	Procurement of 50 large buses (Main Specifications) • 90 passengers • Large bus for urban route bus service • Gross vehicle weight: minimum15 tons • Engine: diesel engine direct injection water-cooling 4 cycle 9,800 cc (minimum) 185 HP (minimum) • Transmission: mechanical type, 5 speed direct drive • Suspension: semi-elliptical alloy steel leaf spring or air suspension • Tire: 10.00R20 (-40°C operation) • Fuel tank: 200 liter (min) • Chassis/frame: semi-frame • Steering: power assisted steering • Handle position: left-hand drive • Doors: 3 doors • Battery 180AH × 2 sets • Heater 15,000kcal/hr	—	Procurement of 40 large buses (Main Specifications) • 90 passengers • Large bus for urban route bus service • Gross vehicle weight: minimum15 tons • Engine: diesel engine direct injection water-cooling 4 cycle 9,800 cc (minimum) 185 HP (minimum) • Transmission: mechanical type, 5 speed direct drive • Suspension: semi-elliptical alloy steel leaf spring or air suspension • Tire: 10.00R20 (-40°C operation) • Fuel tank: 200 liter (min) • Chassis/frame: semi-frame • Steering: power assisted steering • Handle position: left-hand drive • Doors: 3 doors • Battery 180AH × 2 sets • Heater 15,000kcal/hr
Facilities Construc-tion Plan		Construction of the following facilities and procurement of necessary equipment ① Construction of Workshop (Main Building Specifications) • Structure: steel-frame and partial 2-storey single building • Floor area: total 2,340 m^2	

	Phase I	Phase II	Phase III
Facilities Construc-tion Plan	—	• Main Rooms Maintenance-Repair Section (1st Floor) Maintenance bays; machine shop; inspection and fablication area; engine repair room; engine test room; injection pump test room; battery room; tool storage; spare parts storage; electrical room, etc. Administration Section (1st Floor) Administration office; worker's office; locker room, etc. Administration Section (2nd Floor) Director room; administration room; expert's room; meeting and practice room, etc. (Maintenance equipment to be installed in workshop) Large bus maintenance and repair equipment for the following purposes: • Parts machining • Chassis maintenance • Measuring, diagnose and lubricating • Engine/chassis repair • Body repair • Electric parts repair • Parts warehouse • Administrative operation • Seat repairing • Education and training ② Renovation of Washing Facilities (Work Outline) • Renovation of floor of existing washing yard • Construction of water treatment room to recycle washing water • Installation of washing equipment ③ Other • Asphalt paving of outdoor car park	—

The supervisory body and project implementation body for the Project on the Mongolian side are the Ministry of Infrastructure Development and the Transport Department of Ulaan Baatar City respectively.

In the event that the Project is implemented under the Grant Aid extended by the Government of Japan, major items of work to be undertaken by the Mongolian side will be the preparation of land, installation of utilities such as water and hot, water lines, etc. The cost involved is about US$80,000.

The Project duration for each phase is estimated to be as follows.

Phase I	:	detailed design - 2 months
		procurement and transportation of equipment (buses) - 10 months
Phase II	:	detailed design - 3 months
		procurement of equipment and construction of workshop - 12 months
Phase III	:	detailed design - 2 months
		procurement and transportation of equipment (buses) - 10 months

The Mongolian side is required to complete the preparation of all sites, including the temporary material yard, and the utility installation work at these sites as envisaged by the scope of work to be undertaken by the Mongolian side by a specified date. The Mongolian side is also required to establish appropriate liaison with and coordination between all government departments and agencies, etc., related to the Project for the smooth implementation of the Project in cooperation with the Japanese side.

The direct benefit of the Project will be a reduction of the present passenger load from some 2,500 passengers/bus/day to 1,500 passengers/bus/day by means of an increased service frequency, substantially mitigating the pain of the citizens of Ulaan Baatar in terms of waiting for buses during the severe winters.

The operational expense of the planned new buses is estimated to be some 15 million Tg per fleet per year which will be met by the current bus fares. The implementation of the Project with grant aid provided by the Government of Japan is highly significant as it will greatly contribute to improving civic life and vitalising socioeconomic activities in Ulaan Baatar.

CONTENTS

LIST OF TABLES & FIGURES

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CHAPTER 3

ABBREVIATIONS

COMECON	Council for Mutual Economic Assistance
E/N	Exchange of Notes
GDP	Gross Domestic Product
GNP	Gross National Product
IDA	International Development Assistance
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
JIS	Japanese Industrial Standards
O & M	Operation and Maintenance
OJT	On the Job Training
Tg	Tugrig (1US$ = 400Tg)
UB	Ulaan Baatar

CHAPTER 1
BACKGROUND OF THE PROJECT

CHAPTER 1 BACKGROUND OF THE PROJECT

1-1 Background of the Project

Mongolia formerly belonged to the COMECON and strived to conduct nation-building with the assistance of the former Soviet Union and East European countries. In the late 1980's, it adopted a new reformist line after Perestroika in the Soviet Union to proceed with the liberalization of society and economic reform. The liberalization process in the political arena has since been completed through the introduction of a multi-party system, the enforcement of a new constitution, a general election and a presidential election.

Along with the political liberalization, efforts have also been made in the economic field to shift to a free economy through liberalization of prices, elimination of various regulations and privatization of state-owned enterprises. Despite earnest attempts to reform the economy, however, the real GDP has recorded minus growth in recent years because of (i) the suspension of new aid by Russia due to the chaotic economic situation in the former Soviet Union which was Mongolia's main trade partner before its collapse, (ii) the energy supply shortage due to severe oil import cut-backs, (iii) the decline of industrial production due to the supply shortages of fuel and raw materials, (iv) the sluggish market situation for such key export products of Mongolia as copper and wool and (v) the state of confusion in the distribution sector due to the rapid shift to a market economy.

These economic difficulties are reflected on the public bus services in Ulaan Baatar which is the only form of public transport for the capital's some 630,000 citizens (as of 1993). The suspension of aid by former COMECON countries has made it difficult to renew deteriorated buses (many of which were made in the former Czechoslovakia and Soviet Union) and to procure the necessary spare parts. The decline of oil imports caused by the new necessity to pay for oil in foreign currency has resulted in an oil price increase, widening the gap between the operation cost and revenue, in turn disrupting the proper management and operation of the service.

Passenger Transport Bus Company of Ulaan Baatar city was established in 1959 and has now been divided into 4 companies which are run on the basis of a self-supported accounting system. In 1994, a private enterprise was given permission to operate bus services in Ulaan Baatar, bringing the total number of bus operators in the city to 5 with 30 routes.

At present, the total number of buses in Ulaan Baatar is 460, of which 452 (approximately 98%) are owned by the 4 Passenger Transport Bus Companies and 8 are owned by the private carrier. However the only 281 buses of the 452 publicly owned buses (62%) are in a serviceable condition and this number falls far short of the estimated 618 buses (1994) required to provide reasonable public bus transport services in Ulaan Baatar. The current low bus service level is undoubtedly hampering the civic life. Given the fact that the average temperature in winter drops below -20°C in Mongolia and the bus services are practically the sole means of transportation, the damage to civic life caused by the bus shortage cannot be exaggerated.

In order to improve this situation, the Government of Mongolia has requested the Government of Japan's provision of grant aid for the procurement of new buses for Ulaan Baatar. The components of this request were 54 large size buses, 12 middle size buses, spare parts and maintenance equipment. However, the bus depot for the Project as well as operation and maintenance system for the buses to be provided were not clear. Therefore, the Government of Japan decided to conduct a preliminary study to confirm such points, and JICA sent the Preliminary Study Team, headed by Mr. Takuo Kidokoro, Director of First Operations Division, Grant Aid Study and Design Department, to Mongolia for the period between June 16th and July 5th, 1994. Following confirmation of the suitability and scope of Japanese assistance for the Project by the Preliminary Study Team, the Government of Japan then decided to conduct a basic design study on the items requested by Mongolian side, i.e. (i) new large buses, (ii) repair and maintenance equipment for a workshop and (iii) improvement of the facilities required for the sound operation and maintenance of these buses.

1-2 Outline of the Request and Main Components

The requested item from Mongolian side which were confirmed by the Basic Design Study Team are as follows:

Requested Items

(1) 60-90 large buses for public transport services and 2-3 years supply of spare parts.

(2) Maintenance and repair equipment and tools for a workshop to maintain the above buses.

(3) Improvement of facilities which will be neccessary for the sound operation and maintenance of these buses.

In addition, Mongolian side requested technical cooperation by Japanese experts and/or JOCV, for the sound operation, maintenance and management of the Project.

The executing egency in Mongolia for the Project are as follows.

Supervisory Body: Ministry of Infrastructure Development

Implementation Body: Transport Department of Ulaan Baatar city

1-3 Projects and/or Program of Other Donors

1-3-1 World Bank Project

(1) Project Components

According to its Appraisal Report published in April, 1994, the World Bank plans to implement the Transport Rehabilitation Project in Mongolia (hereinafter referred to as the World Bank project) which comprises 3 components, i.e. ① railways subproject, ② urban transport subproject and ③ road freight transport subproject. In regard to urban transport subproject, improvement of the bus transport services in Ulaan Baatar is aimed at with the provision of a loan for the following 4 items.

1) Procurement of 50 diesel buses and 3 years supply of spare parts
2) Procurement of 10 trolley buses and 3 years supply of spare parts
3) Procurement of spare parts for the repair of existing buses
4) Technical cooperation for the passenger transport sector (30 persons/month in regard to such fields as urban transport, maintenance, transport economics, financial planning, route network and system planning, training and bus/trolley bus procurement)

What characterises the World Bank project is the procurement of spare parts for the repair of existing buses. This is intended to improve the availability of the current bus fleet made in Russia and Czechoslovakia from the present 62% to around 80% through the supply of the necessary spare parts while suppressing the need to procure new vehicles. Additional cooperation schemes are planning in the case of technical cooperation, including ① 14 persons/month to provide advice on project implementation, ② 18 persons/month to provide advice on the preparation of transport policies, ③ 6 persons/month to assist the railway sector,

④ 18 persons/month to assist the structural adjustment necessitated by privatisation, ⑤ 15 persons/month to assist the management of the freight transportation business, ⑥ 15 persons/month for training for businesses engaged in freight transportation and ⑦ 30 persons/month for road maintenance and repair, totalling 146 persons/month.

(2) Implementation Schedule

With regard to items 1) through 3), the tender documents have been made available since September 7th, 1994. According to these documents, the procurement schedule for the buses, trolley buses and spare parts is as follows.

1) Closing Date for Tender Application and Opening of Tenders

Originally November 2nd, 1994, then postponed to November 16th, 1994.

2) Planned Date for Contract Signing

Not specified but 4 months after the opening of tenders as the offer price is valid for 120 days.

3) Delivery Date

Diesel Buses	:	Minimum of 20 within 6 months of the signing of the contract and the remainder within 8 months
Trolley Buses	:	Within 6 months of the signing of the contract

4) Delivery Destinations

25 Diesel Buses	:	Passenger Transport Bus - 1 Company
25 Diesel Buses	:	Passenger Transport Bus - 2 Company
10 Trolley Buses	:	Trolley Bus Company

The Appraisal Report suggests the commencement of technical cooperation in the urban transport sector in March, 1995 and the submission of the final report in October, 1995.

1-3-2 Road Transport Master Plan of Asian Development Bank

The Asian Development Bank (ADB) spent the period between June and November, 1993 preparing the Medium and Long-Term Road Improvement Master Plan for a total of some 11,250km state roads (of which 1,190km are paved roads, 1,550km are gravel roads and the remaining 8,510km are earth roads or natural paths) and selected priority improvement sections extending some 720km. It then conducted a feasibility study between March and September, 1994 on these priority sections and completed the basic design for sections extending some 200km.

The selection of priority roads for improvement is based on the total score of 14 criteria, i.e. (1) improvement cost, (2) traffic volume, (3) coal transportation, (4) fuel transportation, (5) transportation of agricultural products, (6) transportation of construction materials, (7) transportation of trade commodities, (8) transportation of mining products, (9) positive contribution to tourism, (10) size of population served, (11) environmental impacts, (12) relationship with the Asia Highway, (13) relationship with the Tumen Development Plan and (14) relationship with the Silk Road.

The Master Plan calls for the road improvement of some 6,262km in the next 10-20 years at a total project of 427 million US$. Priority is given to 24 routes extending 3,898km at a total cost of 322 million US$. The highest priority is given to 3 sections between Darhan and Erdenet, between Narayh and Saynshand and between Narayh and Baga Nuur, totalling 720km.

While a survey or estimate of the intercity road traffic volume and other data was conducted as part of the Master Plan, no similar survey was conducted for urban roads.

1-3-3 Other Major Development Projects in Transport Sector

Following the general move to privatise state controlled sectors, URGAMAL, a private haulage company engaged in the manufacture of trailers and also in transportation using such trailers, commenced a passenger bus service in Ulaan Baatar on August 18th, 1994 with 8 Korean-made buses. At present, URGAMAL operates on Route 11 which was traditionally run by Passenger Transport Bus - 2 Company. On October 15th, 6 buses were added and followed by an additional 6 on December 1st to make a fleet of 20 buses to operate the service on the route for some time to come.

CHAPTER 2
OUTLINE OF THE PROJECT

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2-1 Objectives of the Project

The public buses, which are the only means of public transportation in Ulaan Baatar, are in a serious state of disrepair due to aging and a lack of spare parts. Moreover, the dilapidation of maintenance and repair facilities through aging together with a shortage of equipment has caused bus breakdowns to become a common occurrence, so that the availability of the city's bus fleet has dropped to, on average, 62%. These factors have combined to seriously undermine the capacity of public transportation in Ulaan Baatar and thus adversely affect the civic life and economic activities in the city.

Deeply concerned with this situation, the Government of Mongolia has been advancing the Transport Rehabilitation Project with the aid of the World Bank, however the introduction of the buses included in this project alone will not to achieve the passenger transportation efficiency target of 1,500 per bus per day. For this reason, the immediate procurement of more buses is necessary.

In view of this situation, the Project aims to raise the operating efficiency of bus services through provision of the urgently needed large buses and the construction of the workshop needed for bus maintenance and repair, in order to increase the currently insufficient capacity of the public transport system, which is a vital element of Ulaan Baatar's infrastructure.

2-2 Study and Examination on the Request

(1) Study on the Number of Buses to be Provided

The number of buses required until fiscal 1998 were estimated based on a presumed 10 year, 700,000km operational life, annual operation distance of 70,000km. The availability as of 1993 was low at 62%, however, this is expected to increase with the provision of spare parts from the World Bank project. A target of 88% availability, including buses in periodic inspections, and passenger transport efficiency target of 1,500 per bus per day have been set.

Table 2-2-1 Estimate of Number of Required Busses

	Year	Passenger Transport Bus - 1 Company	Passenger Transport Bus - 2 Company	Passenger Transport Bus - 3 Company	Trolley Bus Company	Private Bus Company (URGAMAL)	(1) Total No. of Busses	Passenger Demand (1000 persons / day)	(2) Required No. of Busses	Difference ((1)-(2))
Buses Fleet Owned	1993	143	137	10	154		444			
	1994	122	130	10	154	20	436			
	1995	110	116	10	154	20	410			
	1996	103	101	10	137	20	371			
	1997	90	87	10	75	20	282			
	1998	70	69	10	39	20	208			
Operational Rate	1993	0.68	0.67	0.65	0.46		0.60			
	1994	0.70	0.62	0.69	0.54	1.00	0.63			
	1995	0.75	0.69	0.74	0.63	0.97	0.69			
	1996	0.79	0.75	0.79	0.71	0.94	0.76			
	1997	0.84	0.82	0.83	0.80	0.91	0.82			
	1998	0.88	0.88	0.88	0.88	0.88	0.88			
Operation Bus Fleet	1993	97	92	7	71		266	560.4	374	108
	1994	85	81	7	83	20	276	617.2	411	135
	1995	82	79	7	96	19	284	641.9	428	144
	1996	81	76	8	97	19	281	666.5	444	163
	1997	75	71	8	60	18	232	691.1	461	229
	1998	62	61	9	34	18	183	715.7	477	294

Source: Study Team Estimate

As there will be a need for 103 buses at the end of 1996 excluding the 60 buses (50 diesel and 10 trolley) provided under the World Bank project, the maximum number of buses requested by the Mongolian side of 90 should be provided under the Project. As 60 of the 108 urgently needed buses at the end of 1993 will be covered by the World Bank project, the Project should provide 50 buses, which almost equivalents to remaining 48 urgent needed buses in its first stage.

(2) Study on the Necessity of New Workshop

The bus workshop is divided into a maintenance workshop for periodic inspections and a workshop for breakdown repair, however equipment in the existing Workshops are mainly of the sort used for breakdown repairs. In particular, testers required to carry out preventive maintenance such as wheel alignment tester, dynamo meter, engine tester, oscilloscope and brake tester etc. are either not in place or are not in a useable condition, and the most important item - the fuel injection pump tester - is also not in a fully useable state.

A setup for carrying out periodic inspections and tuning, which are main works in preventive maintenance, and for performing prompt repair of breakdowns is

indispensable to the safe and normal operation of buses. It is thus necessary to quickly establish a maintenance system by constructing a workshop that is provided with all the necessary machinery and equipment and that is capable of performing the proper maintenance and repair activities.

(3) Study on the Bus Depot for the Buses Provided

Of the five bus companies in Ulaan Baatar, all except the privately operated URGAMAL are operated under permission of the Ministry of Infrastructure Development and receive buses provided to each company by the Transportation Department of Ulaan Baatar city. Furthermore, even for URGAMAL the capital depreciation of the buses are not included in the companies operating costs (as of Sept. 1994), and may be covered by public fund. In short, each company is lent buses and consigned by the city to manage and operate them.

Therefore the destination for the new buses will be determined by the Transportation Department of Ulaan Baatar City, and the buses will be considered property of the Department. Moreover, the alocation of bus routes among companies is also determined by the Department. Basing the buses to be provided under the Project in one location is thought most convenient for the continued operation, maintenance and management of the buses, and the only location which can accommodate this is the sub-depot of the Passenger Transport Bus - 1 Company.

(4) Implementation Plan

The Project's implementation is to be divided into three phases. Phase I will be the procurement of buses which are urgently required and should be given priority handling in order to relieve the extreme state of overcrowding on the city's buses, Phase II will be the construction and rehabilitation of workshop facilities necessary for the sound operation and maintenance of the buses, and Phase III will be the procurement of buses which should be additionally located after confirmation of the performances on operation and maintenance of Mongolian side.

Implementation of the Project with Japan's grant aid has been judged to be appropriate due to the fact that examination has proved its benefits, practicality and the ability of the Mongolian side to implement it, plus the fact that the Project benefits are consistent with the grant aid scheme. Thus, the Project outline is to be examined and a basic study to be implemented on the assumption that grant aid will be provided.

2-3 Project Description

2-3-1 Execution Agency and Operational Structure

(1) Bus Operation

There are currently 371 and 358 bus drivers registered with the Passenger Transport Bus - 1 and 2 Companies respectively and if a normal duty system of two shifts is adopted, operation of 364 buses (371 + 358) ÷ 2 per shift will be possible. According to estimates, even if there are no additional trolley buses, the required number of operating diesel buses for the end of 1996 is 347, which means that even assuming approximately 5% fall in the number of drivers due to leave etc., it will be possible to operate the necessary services.

Furthermore, as the number of skilled unemployed workers in Ulaan Baatar as of April 1994 is some 18,000, the driver work force could be further supplemented if necessary by implementing the required large bus driver training.

(2) Workshop Running

As was previously mentioned (see Section 1-2), the Project Implementation Body on the Mongolian side is the Transport Department of Ulaan Baatar City. This possesses a total work force of 25 (as of June 1994) and is composed of one chairman and one deputy chairman, a finances and accounts division, a personnel division and a bus transport division. Because the Project buses will be assigned to the Passenger Transport Bus - 1 Company (possessing a work force of 992 as of June 1994), the bus maintenance and operating responsibilities will be centered around the same company. When new workshop will be constructed under the Project, the staff needed to run the workshop will be assigned from within the Bus - 1 Compnay in order to establish the necessary manpower setup. The major function of the workshop will also be shifted to new workshop.

The planned workshop requires a staff of 59 and the manpower setup needed for its proper running is illustrated in Fig. 2-3-1. As of June 1994, the Passenger Transport Bus - 1 Company employs a total of 97 skilled repair workshop engineers, of whom 71 (about 73%) have at least six years working experience. It also employs 371 bus drivers, 207 or about 56% of whom possess the same minimum degree of experience.

In consideration of these facts, it is judged that no particular obstacles exist in terms of the necessary man power for implementation of the Project.

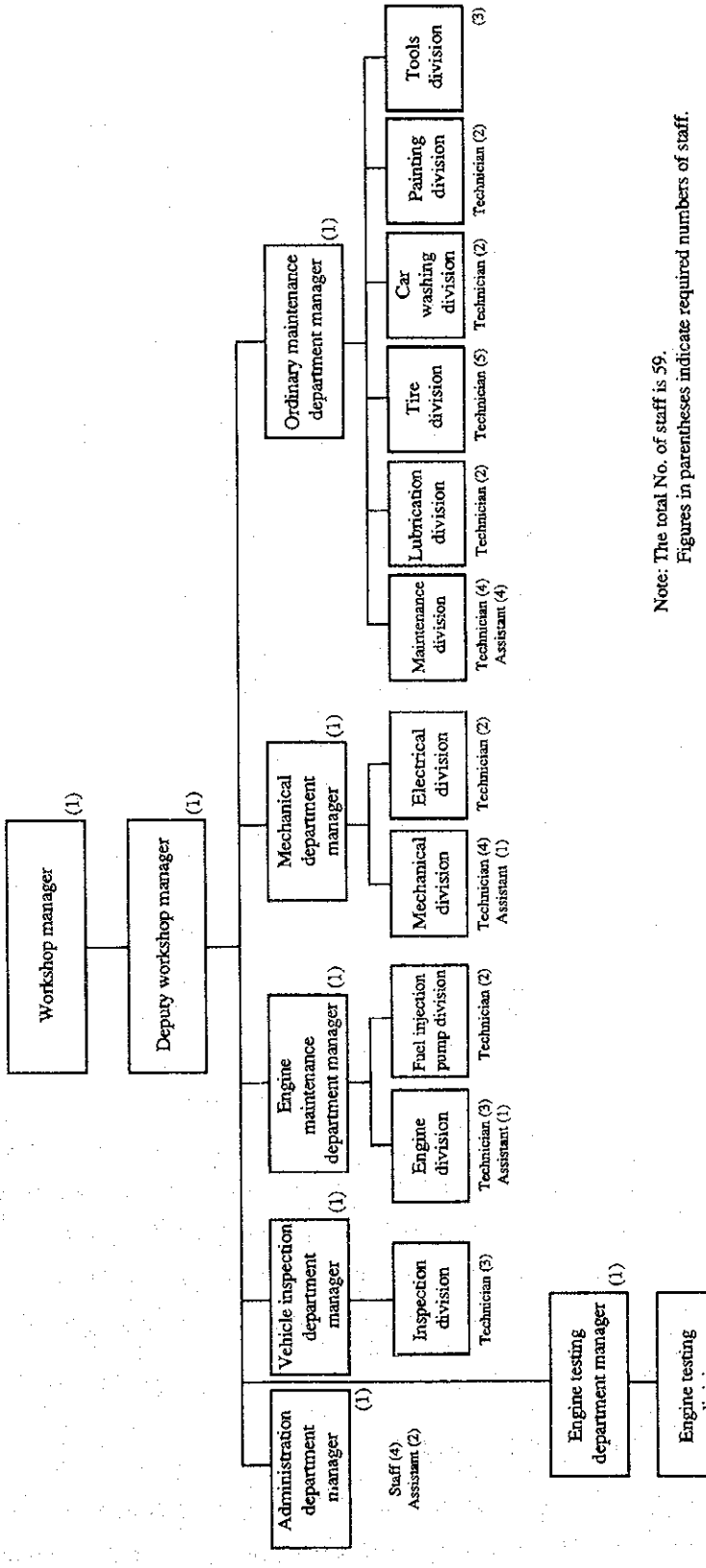

Fig. 2-3-1 Required Manpower for the Project Workshop

(3) Procurement of Fuel for Bus Operation

According to the National Statistics Office in Mongolia, gasoline imports for 1993 amounted to some 170,000 tons, with the month-end storage volume at between 9,700 tons (5.8% of the annual import volume) at its lowest and 26,700 tons (15.9%) at its peak. Imports of diesel oil for the same year totalled 250,000 tons with month-end storage volumes showing a slightly larger dispersion than for gasoline at between 6,500 tons (2.6%) and 47,900 tons (18.9%). However, the month-on-month storage volumes for 1994 show a marked improvement over the previous year, especially so during the winter months.

Table 2-3-1 Fuel Storage Volumes

(Unit: 1000 tons)

	1993		1994	
Month	Gasoline	Diesel Oil	Gasoline	Diesel Oil
1	20.0	6.5	26.1	51.0
2	17.8	12.2	16.0	42.0
3	13.5	9.7	17.2	42.2
4	16.0	13.0	14.0	38.2
5	19.0	13.8	11.6	32.6
6	8.0	10.0	9.9	35.7
7	14.2	22.6	10.6	38.1
8	20.5	35.3	11.3	40.4
9	26.7	47.9	12.0	42.8
10	26.6	47.1		
11	26.4	46.4		
12	26.3	45.6		

Note : Partially prepared complimentarily.
(Source : National Statistics Office)

Assuming that 400 buses operate daily in Ulaan Baatar and that each runs 260km per day at a fuel consumption rate of 3 liter/km, a monthly average of some 800 tons of fuel will be consumed. This amounts to only 2.0% of the average fuel store for between January and September of 40,300 tons and so it can be assumed the required fuel quantity is already secured in absolute terms in the present situation.

(4) Heated Bus Garage for the Winter Months

Minimum temperatures in Ulaan Baatar during the winter recorded as low as -40°C and, excluding trolley buses, it is necessary to store buses in heated

garages in readiness for starting engine in the morning. The following table indicates the garage storage capacity, owned buses and operating buses of each of the Passenger Transport Bus Companies. These figures show that the existing garages can not only store the scheduled operating buses but also hold 167 more, so there are no problems in this respect for the present time. Moreover, in the event where the number of operating buses is increased, the current depot holding capacity is 357 buses and if the garage rebuilding plan of the Passenger Transport Bus - 3 Company is completed, it will be possible to house an additional 20 buses and so raise overall capacity to 377. Assuming an operating trolley bus fleet of 100, adding 10 fleets provided by World Bank project to the present operating 90, it will be possible to house the 477 buses that it is reckoned will be required for city services by the end of 1998.

Table 2-3-2 Bus Heated Garage Capacity

(Unit: 1 bus)

Bus Corporation		Existing Depot Capacity	Existing Buses	Currently Operating Buses [3]	Garage Spare Space
Bus - 1 Company	Main depot	57			
	Sub-depot Garage (A)	60			
	Sub-depot Garage (B)	60			
	Subtotal	177	122	90	87
Bus - 2 Company		160	130	90	70
Bus - 3 Company	Garage (A)	10[1]			
	Garage (B)	10[1]			
	Garage (C)	20			
	Subtotal	20	46[2]	10	10
Total		357	298	190	167

Notes: 1) Under preparation.
2) Including exclusive charter buses.
3) Target values.

2-3-2 Location and Condition on Project Site

2-3-2-1 Natural Conditions

(1) Geographical Location

The Project site is located on the premises of the sub-depot of Passenger Transport Bus - 1 Company which is used as a bus garage during the winter. This sub-depot faces Jinghis Khan Street which is a trunk road in Ulaan Baatar linking Sukhbaatar Square at the centre of the city and the Ulaan Baatar International Airport. It is only some 3km southwest of the city centre and some 2km from the main depot of Passenger Transport Bus - 1 Company. Due to its strategic position vis-a-vis bus operation, it is judged to be the most appropriate site for the workshop. The area around the Project site is designated an industrial area by the Town Planning Department of Ulaan Baatar city. Due to the absence of housing and office buildings in the vicinity, the construction of a bus workshop on this site will not cause any environmental problems.

(2) Topography

Ulaan Baatar is located in a basin some 1,325m above sea level and is surrounded by low mountains of some 300-500m above the basin level. The Project site is almost flat as it is formed by the sedimentation of gravel on the dry riverbed of the Tuul River which runs east-west across Ulaan Baatar.

(3) Geology

While no boring data for the existing buildings on the premises was obtained, the Study Team obtained the boring survey results for a cashmere factory which is under construction on a neighbouring site to the west from a local geological survey company (see Appendix 7). Judging from the boring log for the neighbouring site, the ground of the Project site consists of humus upto 0.4m below the surface and a sandy gravel layer below, indicating good soil characteristics. The Selbe River, a tributary of Tuul River, runs some 100m north of the Project site while the main channel of Tuul River runs some 1km south of the Project site. Due to the proximity of these rivers, the groundwater table fluctuates seasonally from -2.8m GL during the dry winters to -1.5m GL in the wet summers.

(4) Temperature

Mongolia belongs to the continental sub-arctic zone and the winters are particularly severe. As shown by the mean monthly temperature table (Appendix 5), the mean temperature from December to February is below -20°C and the daytime temperature hardly climbs above 0°C even when the weather is fair. In contrast, the mean monthly temperature from June to August is around 15°C which is quite pleasant.

(5) Humidity

In general, Mongolia is a very dry country with mean monthly humidity of a maximum of 75% in December and January. The mean annual humidity is 64%. While this low humidity presents a pleasant climate during the summer, it sharpens the bitterness of the cold winters.

(6) Rainfall

The annual rainfall in Ulaan Baatar is as low as 209mm. The dry season lasts from October to April with mean monthly rainfall of 3-5mm, suggesting almost continuous dry days throughout the dry season. The period between May and September is designated as the rainy season although the mean monthly rainfall is as low as 10-76mm.

(7) Wind

A gentle wind prevails throughout the year and the highest mean monthly wind velocity is 4.0m/s. There are no violent winds associated with typhoons or similar depressions and there is no prevailing wind direction as it changes from season to season.

Smoke from the 4 coal-fired power stations located in the western part of Ulaan Baatar engulf the city in the spring due to the westerly wind with negative impacts on civic life.

(8) Earthquakes

Ulaan Baatar has never been hit by a major earthquake. Most of the city's buildings are low or medium height RC buildings. Nomads live in tents called gel. The design of the workshop building under the Project will present a safe building which can withstand a medium-scale earthquake.