

No.

REPORT ON PRELIMINARY DESIGN

**TRANSPORTATION IMPROVEMENT PROJECT
IN
THE KINGDOM OF NEPAL**

MARCH 1979

JAPAN INTERNATIONAL COOPERATION AGENCY

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REPORT ON PRELIMINARY DESIGN

**TRANSPORTATION IMPROVEMENT PROJECT
IN
THE KINGDOM OF NEPAL**

MARCH. 1979

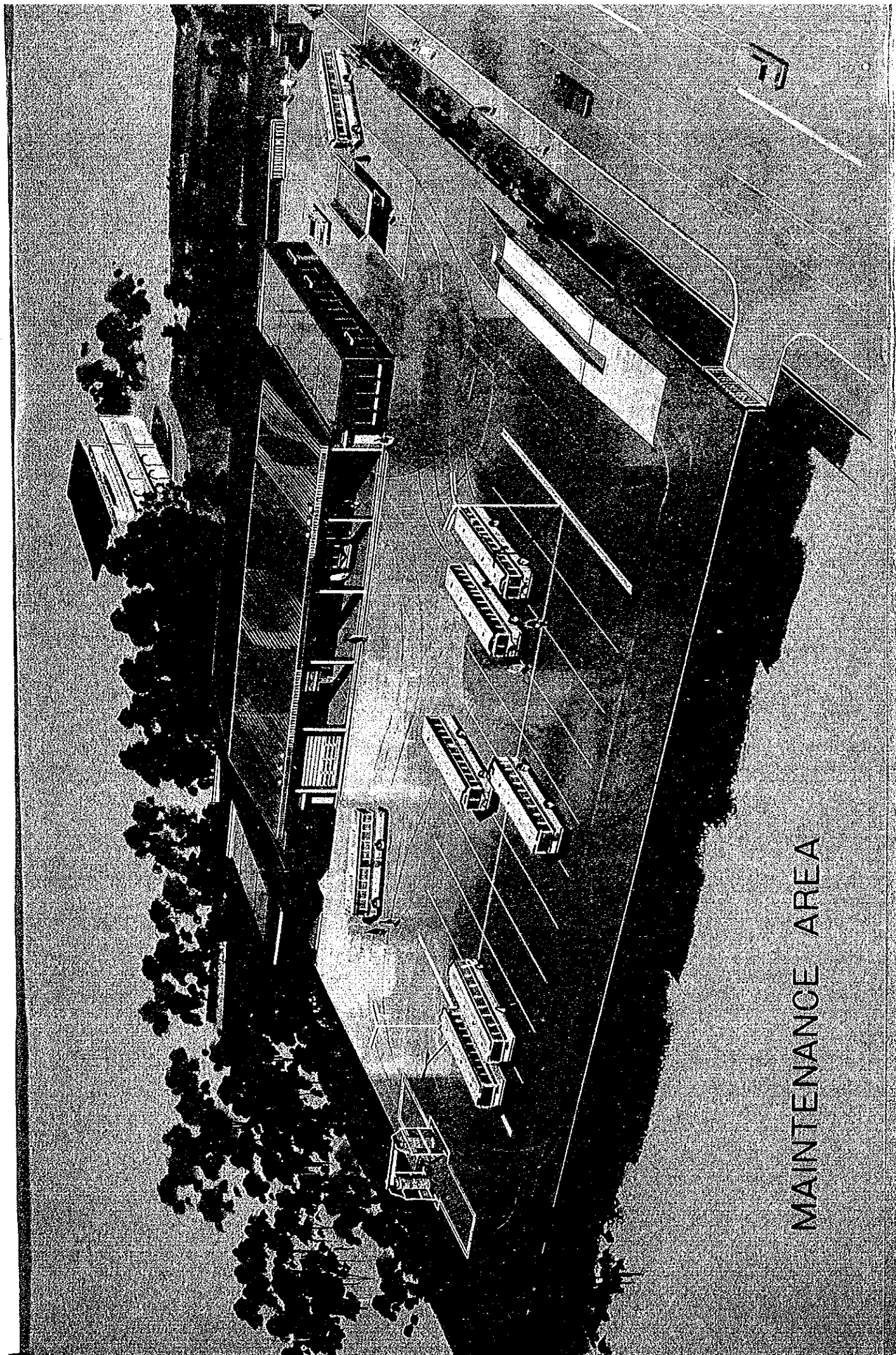
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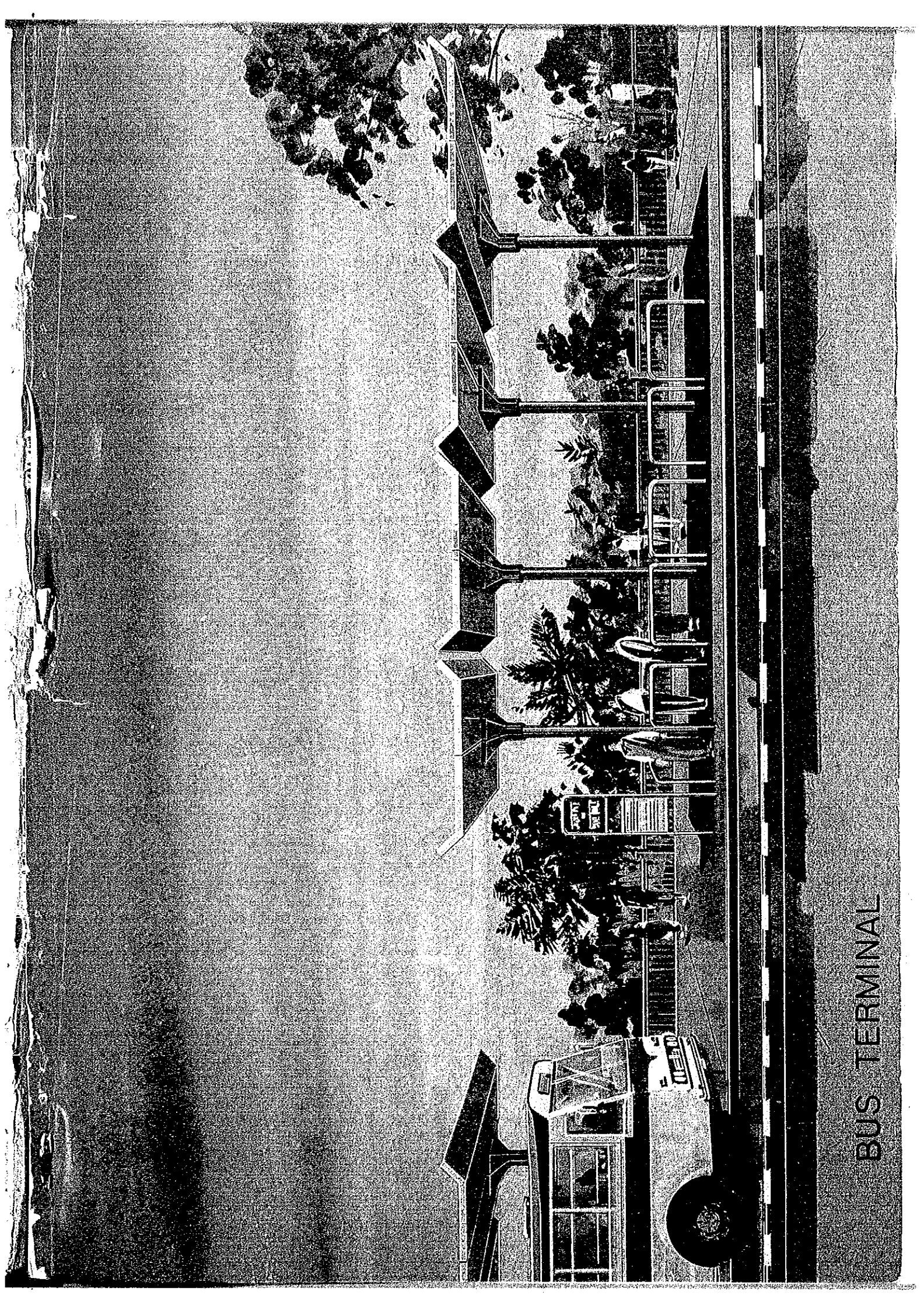
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JAPAN INTERNATIONAL COOPERATION AGENCY

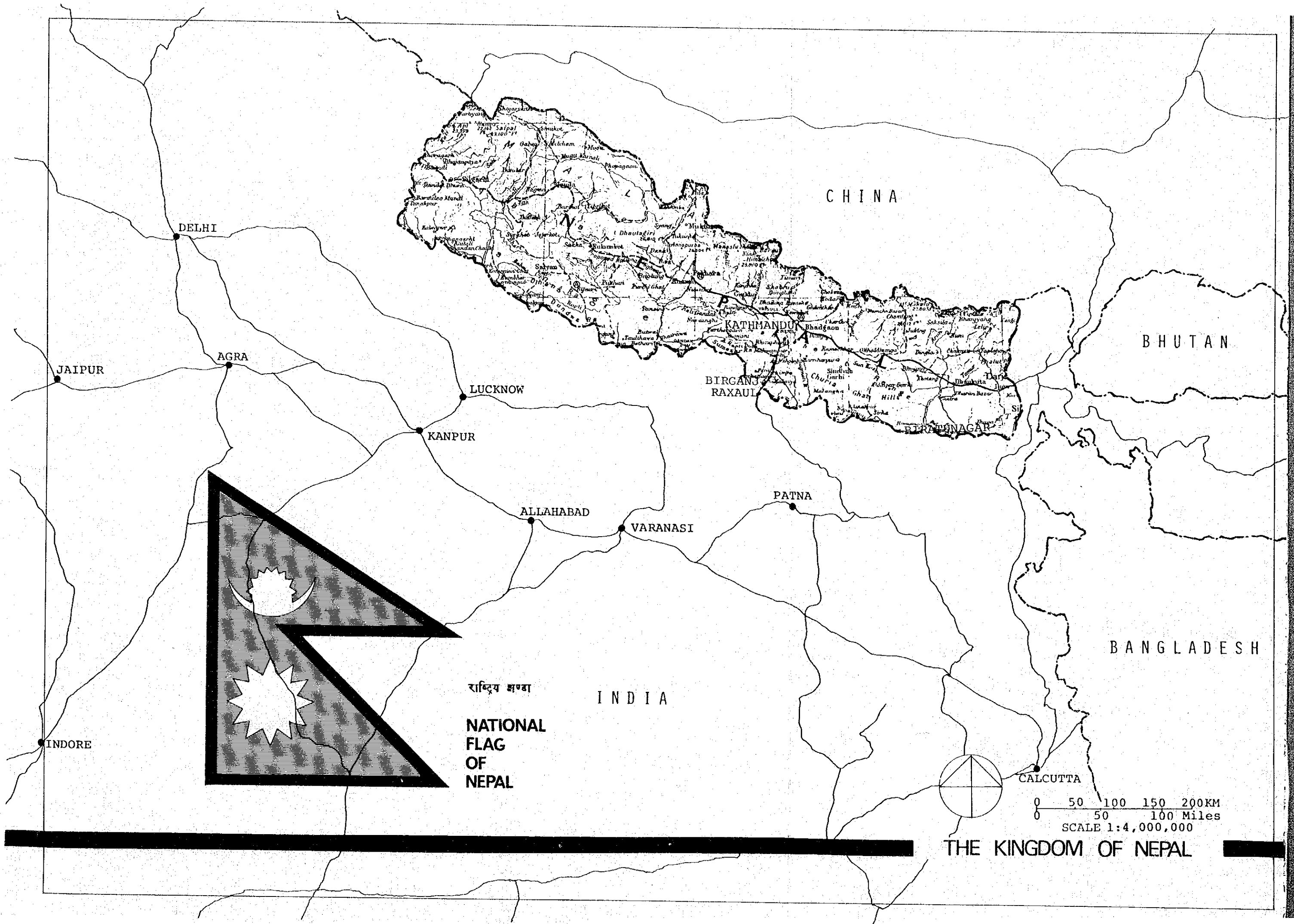
国際協力事業団	
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MAINTENANCE AREA



BUS TERMINAL

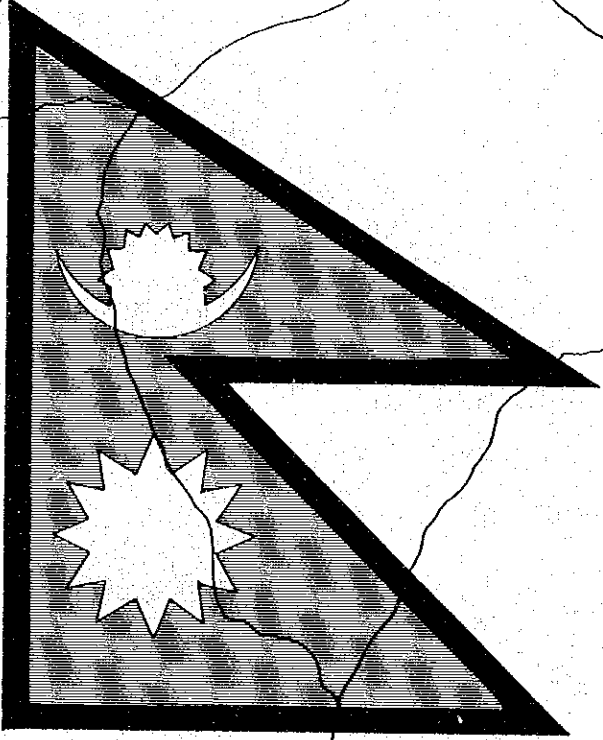


CHINA

BHUTAN

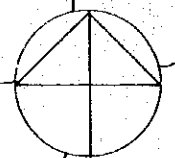
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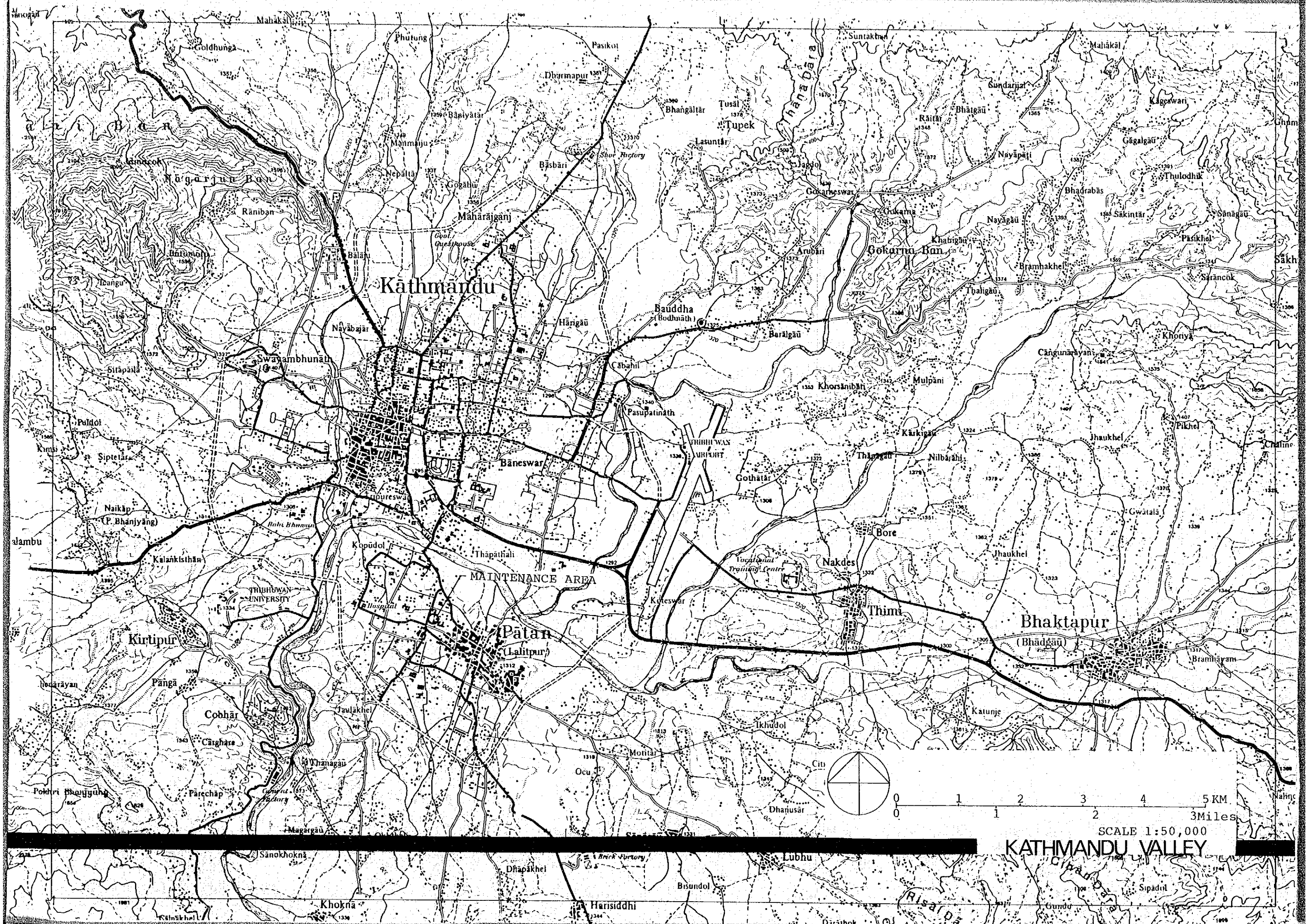
राष्ट्रिय झण्डा

NATIONAL
FLAG
OF
NEPAL



0 50 100 150 200KM
0 50 100 Miles
SCALE 1:4,000,000

THE KINGDOM OF NEPAL

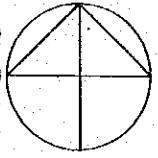


Kathmandu

MAINTENANCE AREA

Patan
(Lalitpur)

Bhaktapur
(Bhadgau)



0 1 2 3 4 5 KM
0 1 2 3 Miles

SCALE 1:50,000
KATHMANDU VALLEY

PREFACE

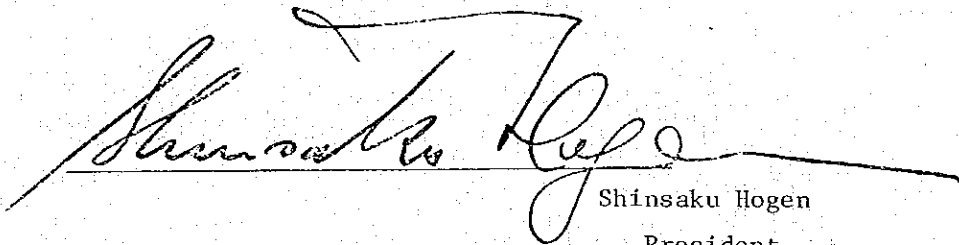
In compliance with the request of the Government of the Kingdom of Nepal, the Government of Japan decided to make a survey for the designing of Construction and Improvement Projects of Facilities for Road Transportation (Transportation Improvement Project) in the Kingdom of Nepal. The Japan International Cooperation Agency (JICA) conducted the survey by dispatching a team to Nepal in November 1978.

In carrying out the survey, the team had close cooperation of the Government of the Kingdom of Nepal. The results of the field survey and the discussions with Nepalese officials were carefully examined and have been compiled into the report presented herewith.

I hope this report will prove to be useful in improving transportation in the Kingdom of Nepal and contribute to the enhancement of friendly relations happily existing between the Kingdom of Nepal and Japan.

I wish to express my deep appreciation to the authorities and the people concerned of the Kingdom of Nepal for their cooperation and hospitality extended to the team during the survey.

March, 1979



Shinsaku Hogen
President

Japan International Cooperation Agency

CONSTRUCTION AND IMPROVEMENT PROJECTS
OF FACILITIES FOR ROAD TRANSPORTATION
(TRANSPORTATION IMPROVEMENT PROJECT)
IN
THE KINGDOM OF NEPAL

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BASIC SURVEY

CHAPTER 1 BASIC SURVEY

- 1-1 OBJECTIVE
- 1-2 ORGANIZATION OF SURVEY TEAM
- 1-3 NEPAL GOVERNMENT MEMBERS
- 1-4 EXCHANGE OF MINUTES
- 1-5 ITINERARY OF SURVEY TEAM

1-1 OBJECTIVE

The Japan International Cooperation Agency dispatched a survey team in November, 1978 in accordance with the request made by the Government of the Kingdom of Nepal and a field survey was carried out for the purpose of strengthening the passenger transportation system in Kathmandu and of cargo transportation in Nepal.

1-2 ORGANIZATION OF SURVEY TEAM

The survey team was composed of seven members with Mr. Kojiro Kaneda, as the leader.

Leader: Kojiro Kaneda (in charge of specifications for buses and trucks)

Director of Environmental Pollution Control Division, Motor Vehicles Transport Bureau of Ministry of Transport.

Member: Toshikazu Mitsui (responsible for bus and truck maintenance equipment)

Motor Transportation Department, Japanese National Railways.

Member: Masato Araya (responsible for maintenance area)

Azusa Sekkei Co., Ltd.

Member: Yasuhiro Fukumoto (responsible for bus terminals and bus stops)

Azusa Sekkei Co., Ltd.

Member: Haruhiko Imai (responsible for operation and management of trucks)

International Development Center of Japan.

Member: Hiroyuki Hotta (responsible for bus routes planning and design).

International Development Center of Japan.

Member: Seiichi Kanai (responsible for arrangement for works)

Development Survey Division,

Social Development Cooperation Division,

Japan International Cooperation Agency,

1-3 NEPAL GOVERNMENT MEMBERS

Mr. Niranjau Bhatta Shrestha

Under Secretary, Ministry of Works & Transport.

Mr. Ananda Bahadur Shrestha

Division Chief, Nepal Transportation Corporation.

Mr. Mukunda Raj Satyal

General Manager, Sajha Yatayat (Transport).

1-4 EXCHANGE OF MINUTES

The minute exchanged by the subject survey team with the Nepal officials are given on the following pages.

MINUTES

The Japan International Cooperation Agency (JICA) survey team dispatched by the Japanese Government in connection with proposed transportation improvement project visited the Kingdom of Nepal during the period from November 7, 1978 to November 22, 1978.

During this period, the JICA team surveyed the sites and conditions of various matters concerned and discussed with the authorities of the Ministry of Works and Transport of H.M.G. (Hereinafter M.O.W.T.)

This is the summary of discussions the both parties had and understandings the both parties tentatively reached during the course of the discussions and survey.

The JICA team will further continue its works in Tokyo to make the final reports and proposals on the basis of this tentative understanding and on the various information materials and what the team found during its survey in Nepal.

JICA will submit the final report in English to H.M.G. sometime around February 1979. At that time the both parties concerned will be able to discuss this project once again.

The followings are the main features of tentative understanding :

A. Urban Bus Transportation improvement in KTM

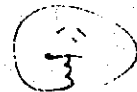
1. Policy for improvement
2. Required buses
3. Maintenance (equipments)
4. Required workshop
5. Required bus terminals and bus stops

B. Improvement of Transit Cargo Transport

1. Policy for improvement
2. Desirable type and size of new trucks
3. Required maintenance (equipments)

C. Technical Cooperation

1. Japanese experts
2. Training in Japan



A. Urban Bus Transportation Improvement in Kathmandu

1. Policy for improvement

1-1. Object

- (i) To meet the demand for the transport of bus passengers in KTM's Valley urban area.
- (ii) To establish bus operation and maintenance systems in order to establish the adequate management of the urban public transportation.

1-2 Contents of the proposed cooperation

- (i) To introduce adequate number of new buses so as to improve bus services, based on the results of survey
- (ii) To construct a workshop with proper equipments in order to establish the maintenance system. This workshop will serve as well as to improve the technical level of local personnel.
- (iii) To establish or reorganize the bus-routs and its facilities. Where necessary, bus-stops and bus-terminals will be newly established upon the complete survey of the current routing and operation.

2. Required Buses

2-1 The following points were requested by the M.C.W.T.

General ; Buses, not easily to be broken down, easy to maintain or to repair

Body ; Not monocoque but with chassis frame



Doors ; 1 At right side for driver
2 At left side for passengers
1 At right side or rear for emergency
exit

Lay-out ; Long bench type, passengers sitting
Passengers' against window
Seat

2-2 Other specifications :- It is necessary to pay special attention to the road conditions and present traffic situations in the proposed area when the size of buses, the material of the passengers' seats, the road clearance at the rearmost part of the body and engine location as well as the specification mentioned in 2-1 are decided.

2-3 Taking the current situation in Nepal into consideration, special attention should be paid to the spare parts for new buses.



3. Maintenance Equipments

Major equipments shall be furnished to the new workshop. Such as

- (1) Electric grinder
- (2) Drilling machine
- (3) Air compressor
- (4) Wheel dolly
- (5) Pitlift
- (6) Special tools
- (7) Standard tools and equipments

4. Required workshop

4-1 Selection of site

From the seven proposed sites for new workshop (see Annex-1) the both parties agreed that - site F (Sahja Yatayat own site) is the most suitable site.

4-2 Workshop

The repairing capacity of the new workshop will be about one hundred buses to be repaired and maintained. The four discussed layouts are attached in Annex-2 for reference. The final layout of workshop shall be completed after further study in Japan.

4-3 Others

Other facilities like garage & staff quarters in the workshop site will be studied and provided corresponding to necessity.

All necessary supply (including electricity, city water and drainage/sewage) shall be prepared up to the site by M.C.T.T.

In the same sense site clearance shall be done by M.O.T.T.

5. Required bus terminals and bus stops

- 5-1 Three bus terminals are required for Jamal, Ratna Park and Shahid Gate.

Shelter, Hand rail and information board are required for each terminal.

A small office for shahidgate and road widening for Jamal are also required.

- 5-2 There will be two types of bus stops. " main bus stop " will be of one with shelter and one information board, "sub bus stop" will be of one with information board.

Proposed nineteen routes are expected to be furnished with above mentioned facilities, subject to utility value of investment.

- 5-3 M.O.W.T. will provide following information by next February.

Revised existing survey maps (1/500) of the above three terminals, which include road, trees, lamp posts, fence, gutter and other facilities in the road.

Section of those three roads are also required. (1/200)

Plotting of the expected bus stops on the map.

Preferable scale is 1/10,000

- 5-4 Site clearing of Jamal will be done by M.O.W.T.

B. Improvement of transit cargo transport

1. Policy for improvement

1-1 Objects

- 1) To meet the demand for the transport of transit cargo from Calcutta to Nepal
- ii) To reduce the cost of the transport

1-2 Contents of the proposed cooperation

- i) To introduce new type of trucks in order to increase the capacity as well as to economize the cost of the transport between Calcutta and Nepal.
- ii) To improve the maintenance work at Birganj so as to achieve the reliable operation of the trucks

2. Desirable type and size of new trucks

2-1 Type

Due to the treaty of trade and transit between H.M.G. and the G.I., containerized trucks are only possible for transport. A most proper type of truck will be selected upon the technical and economic assessments from those three types of containerized trucks such as van type trucks, semitrailer trucks and full trailer trucks.

2-2 Size

- i) A payload^a should be more than 8 M.T. Because it is supposed to be better to introduce trucks bigger than the present size from the view point of cost performance.

- ii) The size and weight of new trucks should conform to the limitation of payload, gross vehicle weight and size of the existing roads.

3. Maintenance Equipments

To strengthen and support the existing workshop at Birgunj, adequate equipments will be required. Such as

- (1) Hydraulic garage jack
- (2) Wheel dolly
- (3) Air compressor
- (4) Outside micrometer caliper
- (5) Dial indicator
- (6) Others

C. Technical Cooperation

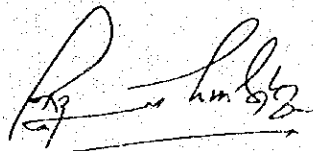
In order to implement the project, the following technical cooperation were requested by M.O.W.T.

1. Japanese experts

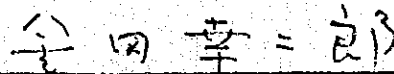
One auto mechanic expert and one transportation management expert

2. Training in Japan

Some number of counterparts from M.O.W.T. to be sent to Japan for studying and training.



Mr. Niranjana Bhakta Shrestha
Under Secretary
Ministry of Works & Transport
H.M.G. of Nepal



Mr. Kojiro Kaneda
Team Leader
The Survey Team for Basic
Design of Transportation
Improvement Project

22 November 1978

ANNEX - 1 EVALUATION SHEET FOR PROJECT SITES (- : Disadvantage, + : Advantage)

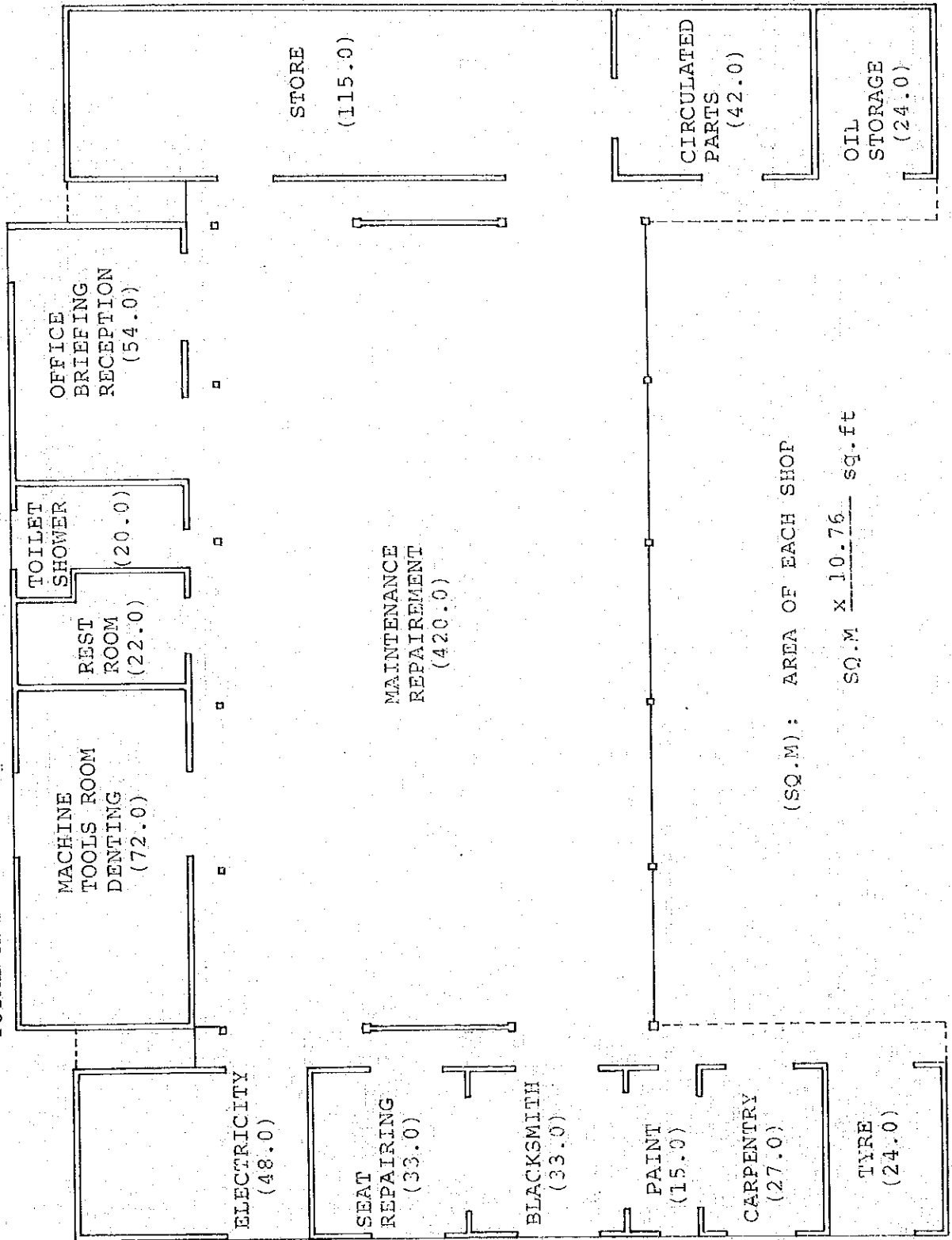
LOCATION	Trolley Works		Near NARE		Near GEUCHATAR		Near NTC Head Office		Near GDR EMBASSY		Sajha's SITE		Near RATNA PARK	
	Site-A	Site-B	Site-C	Site-D	Site-E	Site-F	Site-G	Site-H	Site-I	Site-J	Site-K	Site-L	Site-M	Site-N
Distance from city Center	Far	Very Far	-2	-1	Far	Very Close	+2	Very Close	+2	Very Close	+2	0	Very Close	+2
Distance from NTC Facilities	Very Close	Far	-1	Far	Far	Very Close	+1	Close	0	Far	-1	Close	0	
Access to Main Road	Close	Close	+2	Far	Far	Narrow	-1	Close	+2	Close	+2	Close	+2	
Site Area	Insolvally Narrow	Wide	+2	Wide	Wide	Wide	+2	Wide	+2	Wide	+2	Wide	+2	
Electric Supply	Very Sufficient	Sufficient	+1	Very Sufficient	Very Sufficient	Very Sufficient	+2	Very Sufficient	+2	Very Sufficient	+2	Very Sufficient	+1	
Water Supply	City Water Sufficient	Well	0	City Water	+1	City Water Sufficient	+2	City Water Sufficient	+2	City Water Sufficient	+2	City Water Sufficient	+2	
Sewage/Drainage	Easy		0		0	Easy	+1	Easy	+1	Easy	+1	Easy	+1	
Land Owner	NTC	Private	-1	NTC	+1	Private NTC	0	Private	-1	Private Expensive	-2	KATHMANDU MUNICIPAL	+1	
Obstacles in Site & Site Preparation	House	House	0	Approximate Nothing	+1	Building Cable	-2	Building	-1	Nothing	+2	Approximate Nothing	+1	
Soil Condition	Good	Bad	-1	Good	+1		0		0	Good	+1	Good	+1	
Possibility of Damage (Flood)	None		0		0		0		0	None	+1	None	+1	
Site Preparation	Partially Required	Required	-2	Partially Required	-1	Partially Required	-1	Partially Required	-1	Not Required	+2	Partially Required	+1	
Restriction	Nothing	Near Air Port	-1	Nothing	+1	Truck Yard	0	Near Hospital	-1	Nothing	+1	Bus Terminal	-2	
Evaluation	+10	-3	+4	+6	+7	Excellent	+13	Excellent	+13	Excellent	+13	Excellent	+13	

one fault
: Very narrow

one fault
: Too good for W/S

ANNEX-2a
 WORK SHOP LAYOUT-A1 (SCALE:1/200)

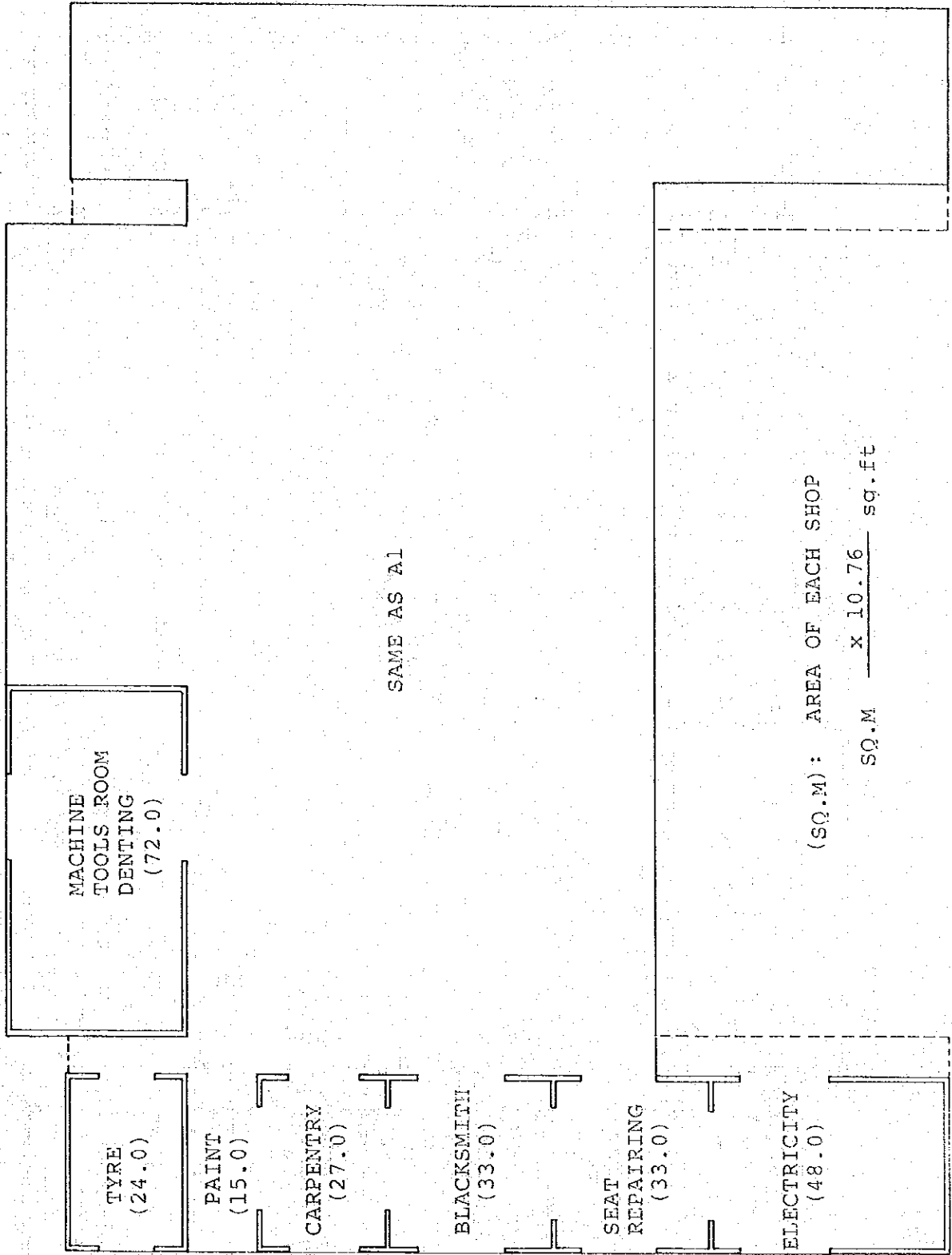
TOTAL AREA = 1025 sq.m \approx 11034 sq.ft



ANNEX-2b

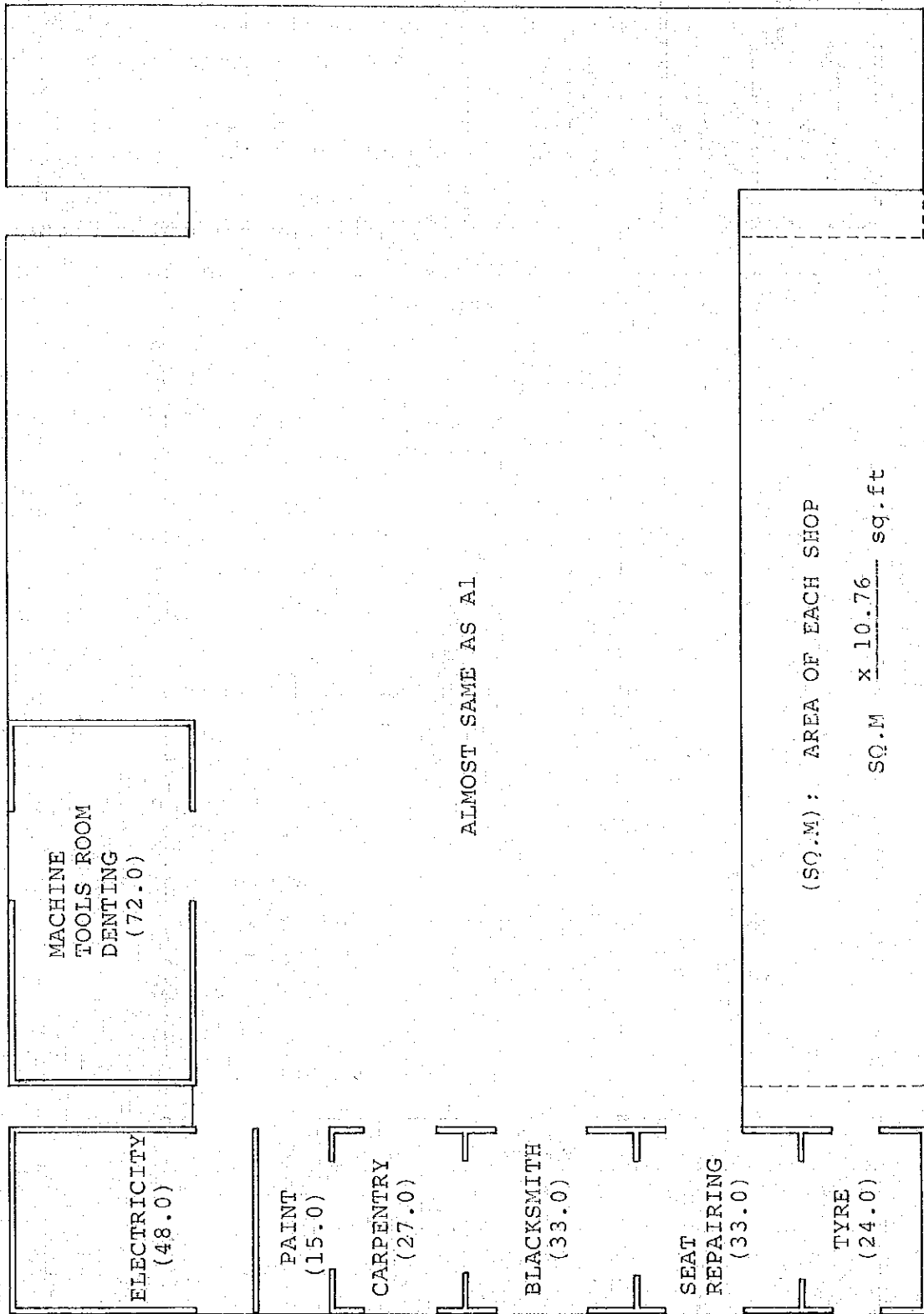
WORK SHOP LAYOUT-A2 (SCALE:1/200)

TOTAL AREA = 1025sq.m = 11034sq.ft



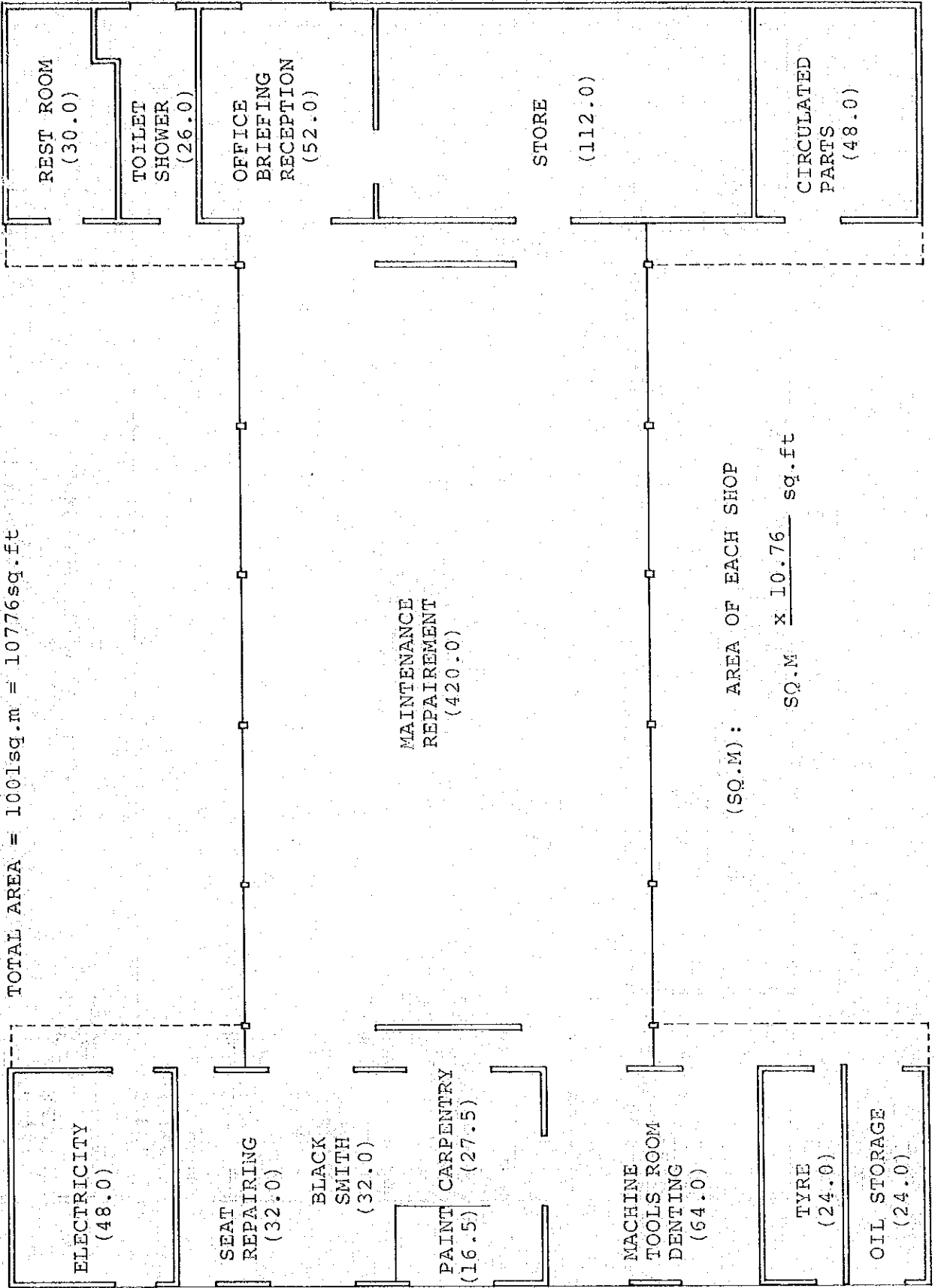
ANNEX-2c
 WORK SHOP LAYOUT-A3 (SCALE: 1/200)

TOTAL AREA = 1025sq.m = 11034sq.ft



ANNEX-2d
 WORK SHOP LAYOUT-B (SCALE: 1/200)

TOTAL AREA = 1001sq.m = 10776sq.ft



(SQ.M) : AREA OF EACH SHOP
 SQ.M x 10.76 sq.ft

1-5 ITINERARY OF SURVEY TEAM

The survey team carried out a survey of the situation at site and discussed matters with the relevant organizations at the site between November 4, 1978 and November 24, 1978.

Survey schedule			Outline of survey
Month	Date	Day	
Nov.	4	Sat.	◦ Travel (Tokyo - Bangkok, JL 717).
	5	Sun.	◦ Travel (Bangkok - Kathmandu, RA 402).
	6	Mon.	◦ Courtesy visit to the Japanese Embassy and to the Ministry of Works & Transportation.
	7	Tue.	◦ Discussions with the Vice-Minister of Ministry of Works & Transportation and also with the officials regarding schedule and contents of the survey.
	8	Wed.	◦ Survey of Ring road and trolley bus operation roads. ◦ Survey of trolley bus maintenance facility. ◦ Discussion among team members regarding contents and schedule of surveys.
	9	Thur.	◦ Survey of project sites of maintenance areas (3 locations).
	10	Fri.	◦ Survey of maintenance of trolley buses and long distance buses. ◦ Survey of all factors affecting construction in Nepal.
	11	Sat.	◦ Survey of Nepal's trunk road (Kathmandu-Pokhara) ◦ Member Imai - Depart for Birganj to survey cargo transportation.
	12	Sun.	◦ Survey of project sites of maintenance areas. (additional 4 locations). ◦ Member Imai - Continuation of survey at Birganj.
	13	Mon.	◦ Leader Kaneda, members Mitsui, Imai & Kanai - Survey of circumstances for passing cargoes which originated from Calcutta. ◦ Members Hotta & Fukumoto - Survey of urban bus routes. ◦ Member Araya - Resurvey of construction circumstances in Nepal and the project sites of maintenance area.
	14	Tue.	◦ Leader Kaneda, members Mitsui, Imai & Kanai - Survey of customs, maintenance facility and cargo transportation in Birganj. ◦ Members Hotta, Fukumoto & Araya - Continuation of previous day survey.

15.	Wed.	<ul style="list-style-type: none"> ◦ Leader Kaneda, members Mitsui, Imai & Kanai - Survey of roads for transportation of imported cargoes. ◦ Members Hotta, Fukumoto & Araya - Continuation of previous day survey.
16.	Thur.	<ul style="list-style-type: none"> ◦ Survey of urban bus transportation. ◦ Presented, and discussed the Evaluation sheet of projects sites with the Nepalese officials. ◦ Discussed the schedule for 17th with Nepalese officials.
17.	Fri.	<ul style="list-style-type: none"> ◦ Explanation of survey to the Nepalese members and discussion of preparation of draft minutes. ◦ Preparation and discussion regarding draft of minutes.
18.	Sat.	<ul style="list-style-type: none"> ◦ Summarization of result of survey on project sites.
19.	Sun.	<ul style="list-style-type: none"> ◦ Explanation of draft minutes to the Nepalese officials and discussion for preparation of final minutes.
20.	Mon.	<ul style="list-style-type: none"> ◦ Explanation of schematic plan of maintenance area for buses. ◦ Presentation of final minutes to the Nepalese officials for their approval.
21.	Tue.	<ul style="list-style-type: none"> ◦ Presented a copy of the final minutes to the Japanese Embassy, for checking before official signatures.
22.	Wed.	<ul style="list-style-type: none"> ◦ Preparation for return to Japan. ◦ Official Signatures and exchange of minutes.
23.	Thur.	<ul style="list-style-type: none"> ◦ Travel (Kathmandu - Bangkok, RA 401).
24.	Fri.	<ul style="list-style-type: none"> ◦ Travel (Bangkok - Tokyo, PA 002).

BASIC SURVEY

CHAPTER 2 SUPPLEMENTARY SURVEY

- 2-1 OBJECTIVE
- 2-2 ORGANIZATION OF SURVEY TEAM
- 2-3 NEPAL GOVERNMENT MEMBERS
- 2-4 EXCHANGE OF MINUTES
- 2-5 ITINERARY OF SURVEY TEAM

2-1 OBJECTIVE

Supplementary survey was carried out to confirm the basic survey and an explanation of the preliminary design.

2-2 ORGANIZATION OF SURVEY TEAM

The survey team was composed of four members with Mr. Shinichi Inoue, as Leader.

Leader: Shinichi Inoue (In charge of specifications for buses, trucks and maintenance equipment)

Technical Official of Transportation, Motor Vehicles Department
Road Transport Bureau of Ministry of Transport.

Member: Masato Araya (Responsible for Maintenance Area)
Azusa Sekkei Co., Ltd.

Member: Yasuhiro Fukumoto (Responsible for bus routes, bus terminals and bus stops)
Azusa Sekkei Co., Ltd.

Member: Fumiaki Kuwakino (Responsible for arrangement for Works)
Development Survey Division, Social Development Cooperation
Division, Japan International Cooperation Agency.

2-3 NEPAL GOVERNMENT MEMBERS

Mr. Krisna Raj Pandey

Chief Engineering Division, Ministry of Works & Transport

Mr. Niranjana Bhatta Shrestha

Under Secretary, Ministry of Works & Transport

Mr. Gocinda Shrestha

Section Officer Division, Ministry of Works & Transport

Mr. Ananda Bahadur Shrestha

Division Chief, Nepal Transportation Corporation

Mr. Tirtha Raj Sharma

Factory Manager, Nepal Transportation Corporation

Mr. Mukunda Raj Satyal

General Manager, Sajha Yatayat (Transport)

2-4 EXCHANGE OF MINUTES

The minutes exchanged by the subject survey team with officials in Nepal have a preamble and contents as previously arranged. The preamble is attached to the following page and the contents are described at Chapter 6 in this report.

MINUTES OF THE MEETING
ON
TRANSPORTATION IMPROVEMENT PROJECT, THE KINGDOM OF NEPAL

The Government of Japan has sent, through Japan International Cooperation Agency (JICA), a Preliminary Survey Team led by Mr. Shinichi Inoue, Deputy Director, Motor Vehicles Department, Road Transportation Bureau, Ministry of Transport, from 17 to 23 February 1979 to explain the Report of the Preliminary Design for Transportation Improvement Project, which was prepared by JICA in accordance with the Minutes of Discussions between Ministry of Works & Transport (MOWT) and Preliminary Survey Team dated November 22, 1978.

The Team held a series of discussions and exchanged views with the Authorities concerned on the establishment of Transportation Improvement Project.

As a result of the Meeting, MOWT and the Team have confirmed the following items:

- (a) The original plan of the Preliminary Design proposed by the Survey Team was accepted by MOWT.
- (b) JICA will submit to MOWT 15 printed copies of the report.

Both parties have agreed to recommend to their respective Governments to take necessary measures toward establishing this project, as stated in the Minutes of Discussions attached herewith.

February 22, 1979
Kathmandu / Nepal

井上真一
SHINICHI INOUE
Team Leader
Japanese Survey Team

K. Pandey
KRISHNA RAJ PANDEY
Chief, Engineering Division
Ministry of Works & Transport

ADDITIONAL ITEMS

1. The Items below should be written in the Report.

For "Bus Specification"

- 1) Overall length About 9.5^M maximum
- 2) Wheelbase 5.2^M at Maximum
- 3) Rear Overhang Two thirds at maximum of the wheelbase
- 4) Fuel tank 130 - 200^l
- 5) Minimum turning radius 10^M at maximum

For "Trucks specification"

- 1) Wheelbase 5.9^m at maximum
- 2) Fuel Tank 200^l x 2

2. The equipments below were required to be included in "Bus Maintenance Equipments, tools and Parts" of the Report by Authorities concerned.

- 1) Gas Cutting tool
- 2) Armature tester
- 3) Battery service outfit
- 4) Dial indicator
- 5) Drum Pump (Oil Rottery)
- 6) Distilled water plant (Pure Water Plant)
- 7) Tube Vulcanizer
- 8) Air spray gun with mask for cleaning

(y)

u/v

3. Bus Terminal

- Bus Terminal Construction may affect the existing Trees.
- M.O.W.T. will provide the following information by the end of April through JICA office.

Revised Survey Maps (1/500) of Ratna Park & Shahid Gate, which include trees, Lamp posts & others.

Plotting of the expected bus stops on the map preferable x scale is 1/10,000.

(3)

WA

2-5 ITINERARY OF SURVEY TEAM

The survey team carried out a confirmation survey and discussed the basic design (plan) with the officials in Nepal between February 25, 1979 and February 24, 1979.

Survey Schedule			Outline of Survey
Month	Date	Day	
Feb.	16	Fri.	◦ Travel (Tokyo - Bangkok, JL 453)
	17	Sat.	◦ Travel (Bangkok - Kathmandu, TG 311) ◦ Discussions with Mr. Saito, the head manager of JICA in Nepal.
	18	Sun.	◦ Courtesy visit to the Japanese Embassy and to the Ministry of Works & Transportation. ◦ Observation of trolley bus work shop of NTC. ◦ Explanation of basic design (plan) to the Nepalese Officials.
	19	Mon.	◦ Discussions of bus and maintenance equipment.
	20	Tue.	◦ Discussions of bus routes, bus terminals and bus stops. ◦ Discussions of Maintenance area. ◦ Discussions of trucks and maintenance equipment.
	21	Wed.	◦ Preparation of draft minutes of proceedings. ◦ Explanation of draft minutes of proceedings to the Nepalese Officials for their approval.
	22	Thu.	◦ Confirmation and survey of the site for maintenance area. ◦ Confirmation and survey of bus routes. ◦ Official signatures and exchange of minutes of proceedings.
	23	Fri.	◦ Travel (Kathmandu - Bangkok, RA 401)
	24	Sat.	◦ Travel (Bangkok - Tokyo, JL 401)
	25	Sun	◦ Travel (Bangkok - Tokyo, JL 401)

1. Introduction

2. Methodology

BASIC SURVEY

CHAPTER 3 SUMMARY OF TRANSPORTATION IMPROVEMENT PROJECT

3-1 OUTLINE OF PROJECT

3-2 URBAN BUS IMPROVEMENT PROJECT

3-3 TRANSIT CARGO TRUCK IMPROVEMENT PROJECT

3-1 OUTLINE OF PROJECT

The Kingdom of Nepal occupies an area of about 140,000 km², the population is about ten million, and about ninety percent of the population are engaged in agriculture. Geographically, the country is located inland on the skirt of the Himalayas, and dwelling areas are distributed in the northern mountainous area at the altitude of 4,000 - 5,000 m, central intermediate area of the altitude of 1,500 m, and southern tableland area of the altitude of 1,000 m. The climate is in subtropical monsoon zone. Rainy season (May through October) and dry season (November through April) are distinctly separate. Annual precipitation is about 1,500 mm with maximum monthly rainfall of as much as about 350 mm (August). Because the country is located on subtropical tableland, the temperature is mild throughout the year.

The Kathmandu urban area, which is the heart of politics and culture, is situated in lat. 27° 40'N. and log. 85° 20' E. at an altitude of 1,300 m. It is composed of three administrative districts, that is, Kathmandu, Lalitpur and Bhaktapur, and the population is about 730,000 (surveyed in 1971). The Kathmandu valley has Kathmandu City as the social and industrial nucleus, it spreads over three administrative districts mentioned earlier, and is inhabited by 484,551 persons with the population density of 570 persons per square kilometer, which is the highest in the country. The urban transportation in this area is centralized in Kathmandu City, and is entirely supported by road transportation. The ownership rate of automotive vehicles by the inhabitants is low, and urban transportation is dependent on the bus services. These services are operated by NTC, which is public, Sajha Yatayat, which is semipublic and semi-private, and by several private bus companies as well as private individuals. They do not fulfill the role of public transportation and establishment of a transportation system, which is to form the basis of urban activities, is urged.

In the Kingdom of Nepal, cargo transportation has been made mainly with road transportation because of its geographical environment, that is, no suitable river for transportation, and also because it is situated on the skirt of the Himalayas. Intercourse with China is difficult and intercourse among regions in the country are also difficult because of the regional geography. Manual labour and the small number of vehicles causes transportation to be made between high and low lands in the country. Under these circumstances, there is a close relationship with India with respect to goods distribution, and there are many cases where trans-

portation of goods is made through Nepal on the route to India, rather than within Nepal. Therefore, the increase of transportation capacity of transit cargoes is essential for development of the economy of Nepal.

The following project is to establish and increase transportation capacity under the stated circumstances.

For urban bus transportation in the Kathmandu urban area the following are recommended.

- (1) Setting of bus routes;
- (2) Introduction of passenger buses to Kathmandu City.
- (3) Introduction of bus maintenance equipment to accompany (2) above;
- (4) Construction of maintenance area to accompany (2) above;
- (5) Construction of bus terminals and bus stops; and
- (6) Improvement of operation and management of bus services.

For transit cargoes transportation through Nepal;

- (7) Introduction of suitable cargo trucks; and
- (8) Introduction of truck maintenance equipment to accompany (7) above.

This project policies are:

- (1) To fully reflect the will of users in the Kingdom of Nepal.
- (2) To facilitate maintenance and control after completion of the project in accordance with the situation in the Kingdom of Nepal.
- (3) To employ local technology as much as possible in the process of execution of the project.
- (4) To fully take into consideration the natural and human environment in the Kingdom of Nepal.
- (5) Design and specifications shall be based on the laws, rules, regulations and standards of Japan and be partially modified to suit the situation in the Kingdom of Nepal.

3-2 URBAN BUS IMPROVEMENT PROJECT

3-2-1 Current Problems

(1) Unconsolidated urban traffic system

The survey shows that the number of users of bus services in the heart of the town is as many as 50,000 persons per day including users of trolley buses (5,000 persons per day) and unsurveyed areas.

When the operation shares of buses and mini buses (excluding trolley buses) are observed, buses of NTC and Sajha have 28 percent in total, privately operated buses have 35 percent, and the

remaining 37 percent depends on mini buses. When the figures of person-kilometer of transportation are observed, mini buses have as much as 49 percent. This is nearly one half, indicating large dependability on mini buses.

Table 3-1 Survey on actual state of bus services
(November, 1978)

		On/off passengers at heart of town		Transported man-kilometer	
		Persons/day	%	Man-kilometer	%
BUS	NTC	2,933	7.4	21,840	6.7
	SAJHA	7,900	20.0	53,955	16.5
	PRIVATE	13,951	35.3	91,572	27.9
MINI BUS		14,771	37.3	160,517	48.9
TOTAL		39,555	100.0	327,884	100.0

The above fact is due to a shortage of public bus services.

Many mini buses are privately operated in the form of one mini bus individually owned. Although the number of their operations is high during peak hours, it decreases during off-peak hours. In addition, they do not fulfill the role as a means of public transportation.

(2) Problems on operation management

Bus services in Kathmandu possess good profitability as long as indices of the current transportation and operating cost are observed. It can also be recognized from the management of Sajha and other private bus companies including mini buses.

The current situation of NTC urban bus service can be observed as follows:

1. Load factor during peak hours is extremely high.
2. Number of operations as scheduled is not accomplished.
3. Fare income is small compared to the number of passengers.
4. Wear and tear of vehicles in high and troubles are frequent.
5. Number of operation systems has been reduced. (Three routes were operated on survey in April, 1978, but only one route (Kirtipur) has been operated on survey in November, 1978).

Major causes for the above phenomena are as follows.

1. Profitability is low due to complicated fare system compared to the operating distance.

Table 3-2 Fare system

Route	Fare	Running distance (km)	Unit:Pisa												Kinds of fare	
			20	30	35	40	45	50	55	60	65	70	75	100		
LAGANKHEL		7.5	○	○		○							○			4
JORPATI		9	○	○		○		○					○		○	6
NARAYANSTHAN		10.5	○			○									○	5
THANKOT		10	○		○		○	○					○		○	6
BALAJU		5	○	○		○										3
PATANDHOKA		5	○	○		○										3
BHAKTAPUR		14											○		○	2

2. Fare collection rate is poor because conductors are inefficient in collection of fares and passengers frequently ride for no charge.
3. An operation management method has not yet been established and business initiative for profitability is weak in NTC.
4. Absolute number of vehicles is too small, to satisfy the demand during peak hours.
5. Because of non-possession of maintenance facility or equipment, quick maintenance and repair of vehicles, are impossible resulting in shortage.
6. The role of NTC has been reduced in the urban bus services due to poor profitability.

3-2-2 Policies for Increasing Transportation Capacity

Based on the problems stated above, the policies for increasing transportation capacity of urban bus services as the means of public transportation in Kathmandu are follows.

- (1) To accomplish a reliable public transportation system through the introduction of urban buses into the existing bus route Mr. Niranjan by mini buses.
- (2) To establish the operation plan and to increase number of vehicles to fully satisfy the demand.
- (3) To strengthen vehicle maintenance system for securing routine operations and for making effective use of vehicles.

- (4) To introduce vehicles of suitable types.
- (5) To furnish bus terminals and bus stops for making operation and on/off of passengers smooth.
- (6) To reorganize the fare system and to establish means for suitably collecting fares.
- (7) To improve efficiency of management control including operation and maintenance.

Items 6 and 7 stated above involve political and organizational problems and it is not possible to reach rapid resolution.

Therefore, the objects of assistance are as follows.

- (1) Supply of urban buses
- (2) Supply of maintenance equipment
- (3) Construction of maintenance facilities
- (4) Installation of bus terminals and of bus stops
- (5) Technical instruction related to vehicles maintenance and operation planning.

3-3 TRANSIT CARGO TRUCK IMPROVEMENT PROJECT

3-3-1 Current Problems

The current situation of transit cargo transportation can be observed as follows;

- (1) Demand for transportation has not been fully developed, and the share of NTC is low.
- (2) NTC has trucks of van type made by Leyland. Ten trucks are currently used, but demand is limited to six months only per year, and they are not operating in the remaining six months.
- (3) These trucks cannot fully satisfy the seasonal transportation demand, and a part of the cargoes must be entrusted to outside transportation.

Increases of cost and reduction of profit occur as a result. Major reasons for the above problems are as follows.

- (1) Excessive fluctuation of demand for transit cargo transportation and vehicle operation management are difficult.
- (2) Due to low capacity add high cost of transportation, obtaining cargoes is difficult and it is not possible to satisfy the usual demand.
- (3) Due to insufficient existance of bonded warehouse, and related facilities in Birganj customs, loading/unloading cannot be made when documents have not arrived, and the vehicles cannot be operated.

- (4) Road conditions between Hetanda and Kathmandu are poor, and the vehicles which can travel along this course are limited to those of 8 tons or less.
- (5) Because the size of vehicles currently possessed is small, competitive force is less than that of Indian transporters.

3-3-2 Basic Policies for Increasing Transportation Capacity

For the purpose of improving transportation and developing the market, the policies for increasing transportation capacity for cargoes from Calcutta are as follows.

- (1) To increase transportation capacity through the operation of large size vehicles between Calcutta and Birganj. (Vehicles travelling between Biratunagar and Calcutta are limited due to road conditions.)
- (2) To consolidate the facility of Birganj customs and to strengthen Calcutta office.
- (3) To strengthen function of operation and control, and improve efficiency at Birganj customs.
- (4) To make efforts at securing export cargoes and maintaining competent freight charge.

3-3-3 Object of Assistance

The objects of assistance are as follows.

- (1) Supply of containerized trucks of van type or of trailer type.
- (2) Reinforcement of vehicle maintenance in Birganj.
- (3) Technical instruction related to the above.